Including Best Available Science in the Designation and Protection of Critical Areas Under the Growth Management Act

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I. INTRODUCTION AND BACKGROUND

A. The GMA Requires That Every County and City Designate and Protect Critical Areas

Washington's Growth Management Act (GMA), located in title 36, chapter 70A of the Revised Code of Washington (RCW), was enacted in 1990 and 1991 in response to public concerns about rapid population growth and increasing development pressures in the state, especially in the Puget Sound region.[1] The GMA has remained controversial and has been amended every year since its original enactment.[2]

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1. WASH. REV. CODE ch. 36.70A (1998). [All citations to ch. 36.70A of the Revised Code of Washington are to the 1998 edition unless otherwise indicated - Eds.] *See* Skagit Surveyors & Engineers, LLC v. Friends of Skagit County, 135 Wash. 2d 542, 546-47, 958 P.2d 962, 964 (1998). The GMA was enacted originally in two "installments," at 1st Ex. Sess., ch. 17, 1990 Wash. Laws 1972, and 1st Spec. Sess. ch. 32, 1991 Wash. Laws 2903. For a review of the political history and controversies surrounding its enactment, see Richard L. Settle & Charles G. Gavigan, *The Growth Management Revolution in Washington: Past, Present, and Future*, 16 U. PUGET SOUND L. REV. 867, 869-96 (1993).

2. *Skagit Surveyors*, 135 Wash. 2d at 547, 958 P.2d at 964. *See also* 1991 Wash. Laws, ch. 322, 1st Sp. Sess., ch. 32; 1992 Wash. Laws, ch. 207, 227, 277; 1993 Wash. Laws, ch. 478, Sp. Sess., ch. 6; 1994 Wash. Laws, ch. 249, 257, 258, 273, 307; 1995 Wash. Laws, ch. 49, 190, 347, 377, 378, 382, 399, 400, 402; 1996 Wash. Laws, ch. 167, 239, 325; 1997 Wash. Laws, ch. 382, 402, 429; 1998 Wash. Laws, ch. 112, 171, 245, 249, 286, 289; 1999 Wash. Laws, ch. 315. *See*

The GMA requires every county and city in Washington to adopt development regulations that designate and protect critical areas.[3] "Critical areas" are defined to "include (a) wetlands, (b) areas with a critical recharging effect on aquifers used for potable water, (c) fish and wildlife habitat conservation areas, (d) frequently flooded areas, and (e) geologically hazardous areas."[4] The designation and protection of critical areas is one of the first requirements that must be satisfied under the GMA.[5]

Act of July 28, 1991, ch. 322, 1991 Wash. Laws 1707; Act of July 16, 1991, 1st Sp. Sess., ch. 32, 1991 Wash. Laws 2903; Act of July 11, 1992, ch. 207, 1992 Wash. Laws 940; Act of June 11, 1992, ch. 227, 1992 Wash. Laws 1050; Washington Housing Policy Act, ch. 478, 1993 Wash. Laws 1995; Act of June 1, 1993, Sp. Sess., ch. 6, 1993 Wash. Laws 2564; Act of April 1, 1994, ch. 249, 1994 Wash. Laws 1378; Act of April 1, 1994, ch. 258, 1994 Wash. Laws 1546; Act of April 1, 1994, ch. 273, 1994 Wash. Laws 1727; Act of April 2, 1994, ch. 307, 1994 Wash. Laws 1988; Act of April 17, 1995, ch. 49, 1995 Wash. Laws 208; Act of May 1, 1995, ch. 190, 1995 Wash. Laws 613; Act of May 15, 1995, ch. 347, 1995 Wash. Laws 1556; Act of May 16, 1995, ch. 377, 1995 Wash. Laws 1832; Act of May 16, 1995, ch. 378, 1995 Wash. Laws 1834; Act of May 16, 1995, ch. 382, 1995 Wash. Laws 1851; Act of May 16, 1995, ch. 399, 1995 Wash. Laws 1992; Act of May 16, 1995, ch. 400, 1995 Wash. Laws 2121; Act of May 16, 1995, ch. 402, 1995 Wash. Laws 2133; Act of March 28, 1996, ch. 167, 1996 Wash. Laws 607; Act of March 28, 1996, ch. 239, 1996 Wash. Laws 1117; Act of March 30, 1996, ch. 325, 1996 Wash. Laws 1722; Act of May 15, 1997, ch. 382, 1997 Wash. Laws 2297; Act of May 16, 1997, ch. 402, 1997 Wash. Laws 2499; Act of May 19, 1997, ch. 429, 1997 Wash. Laws 2615; Act of March 23, 1998, ch. 112, 1998 Wash. Laws 371; Act of March 27, 1998, ch. 171, 1998 Wash. Laws 599; Act of March 31, 1998, ch. 245, 1998 Wash. Laws 1021; Act of April 1, 1998, ch. 249, 1998 Wash. Laws 1195; Act of April 2, 1998, ch. 286, 1998 Wash. Laws 1421; Act of April 2, 1998, ch. 289, 1998 Wash. Laws 1438; Act of May 14, 1999, ch. 315.

3. WASH. REV. CODE §§ 36.70A.060(2), .170(1). Of the thirty-nine counties and 278 cities in Washington required to adopt critical areas ordinances under the GMA, four counties and twenty-six cities still were without critical areas ordinances as of December 1998. WASHINGTON DEPARTMENT OF COMMUNITY, TRADE AND ECONOMIC DEVELOPMENT (DCTED), GROWTH MANAGEMENT PROGRAM, CRITICAL AREAS ORDINANCE REVIEW PROJECT: FINAL REPORT 2 (1998), *reprinted in* 2 GOVERNOR'S SALMON RECOVERY OFF., DRAFT STRATEGY TO RECOVER SALMON: EXTINCTION IS NOT AN OPTION (Jan. 1999). The four counties without critical areas ordinances were Chelan, Klickitat, Stevens, and Wahkiakum. *Id.* at 5-6. Chelan County adopted new critical areas ordinances in December 1998 and January 1999; a challenge to their compliance with the GMA before the Eastern Washington Growth Management Hearings Board was resolved in September 1999. *See* Save Our Butte Save Our Basin Soc'y v. Chelan County, Eastern Washington Growth Management Hearings Board (EWGMHB) No. 94-1-0015, Stipulated Order of Compliance Re Critical Areas Regulations (Sept. 13, 1999). In addition to those local governments without critical areas ordinances, the adopted critical areas ordinances of four counties and 53 cities do not address all five types of critical areas. DCTED, *supra*, at 3.

4. WASH. REV. CODE § 36.70A.030(5).

5. The GMA's central substantive requirements have the following chronology:

(1) Designation and protection of critical areas and natural resource lands. WASH. REV. CODE §§ 36.70A.060, .170.

(2) Adoption of countywide planning policies and multicounty planning policies. WASH. REV. CODE § 36.70A.210.

(3) Designation of urban growth areas. WASH. REV. CODE § 36.70A.110.

(4) Adoption of the comprehensive plan. WASH. REV. CODE § 36.70A.040.

(5) Adoption of development regulations to implement the comprehensive plan. WASH. REV.

The GMA requires that critical areas be designated and protected before other planning requirements are undertaken. This precludes the designation of critical areas as suitable for urban development and prevents irreversible environmental harm while the comprehensive plan and implementing development regulations are prepared.[6] While critical areas regulations can be altered if necessary to achieve consistency between the critical areas regulations and the subsequently adopted comprehensive plan and implementing development regulations,[7] the designations and protections provided by the critical areas regulations must be incorporated into the comprehensive plan and implementing development regulations.[8] The designation

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CODE § 36.70A.040.

See also Settle & Gavigan, *supra* note 1, at 906-20. Critical areas were to have been designated by development regulations adopted by September 1, 1991. WASH. REV. CODE § 36.70A.170(1). For counties and cities subject to the planning requirements of the GMA, development regulations to protect critical areas also were to have been adopted by September 1, 1991. WASH. REV. CODE § 36.70A.060(2). Other counties and cities had until March 1, 1992, to adopt development regulations to protect critical areas. *Id.*

6. Settle & Gavigan, *supra* note 1, at 907 (1993), *cited in* City of Redmond v. Central Puget Sound Growth Hearings Bd., 136 Wash. 2d 38, 48, 959 P.2d 1091, 1094 (1998) (discussing natural resource lands, which must be designated and conserved concurrently with critical areas pursuant to RCW 36.70A.060 and .170). For early assessments of efforts to implement critical areas ordinances, see Alison Moss & Beverlee E. Silva, *Regulation of Wetlands in Western Washington Under the Growth Management Act*, 16 U. PUGET SOUND L. REV. 1059 (1993); and Gary Pivo, *Is the Growth Management Act Working? A Survey of the Resource Lands and Critical Areas Development Regulations*, 16 U. PUGET SOUND L. REV. 1141 (1993). For a prospective approach to designating and protecting significant fish and wildlife habitat in critical areas under the GMA, see Alan D. Copsey, *The Protection of Wildlife Under Washington's Growth Management Act*, 16 U. PUGET SOUND L. REV. 1101 (1993).

7. WASH. REV. CODE § 36.70A.060(3). A "comprehensive plan" is a "generalized coordinated land use policy statement of the governing body of a county or city" adopted pursuant to the GMA. WASH. REV. CODE § 36.70A.030(4). Counties and cities must "perform [their] activities and make capital budget decisions in conformity with their comprehensive plans." WASH. REV. CODE § 36.70A.120. Settle & Gavigan, *supra* note 1, at 915, described the comprehensive plan as "the central nervous system of the GMA," which "must contain data and detailed policies to guide the expansion and extension of public facilities and the use and development of land" as prescribed by the GMA. The form and specific requirements for comprehensive plans are set forth in RCW 36.70A.070 and elsewhere in the GMA and in numerous decisions of the Growth Management Hearings Boards. "Development regulations" are "the controls placed on development or land use activities by a county or city, including, but not limited to, zoning ordinances, critical areas ordinances, shoreline master programs, official controls, planned unit development ordinances, subdivision ordinances, and binding site plan ordinances together with any amendments thereto." WASH. REV. CODE § 36.70A.030(7). The comprehensive plan generally must be implemented through the adoption of development regulations. *See* Citizens for Mount Vernon v. City of Mount Vernon, 133 Wash. 2d 861, 873, 947 P.2d 1208, 1214-15 (1997).

8. *See* WASH. ADMIN. CODE § 365-195-410(2) (1999). In two early cases, the Central Puget Sound Growth Management Hearings Board treated critical areas regulations as interim in nature. *See* Association of Rural Residents v. Kitsap County, Central Puget Sound Growth Management Hearings Board (CPSGMHB) No. 93-3-0010, Final Decision and Order, at 424 (June 3, 1994); Gutschmidt v. City of Mercer Island, CPSGMHB No. 92-3-0006, Final Deci-

and protection of critical areas is an important determinant of where development should or should not occur.

In designating and protecting critical areas, counties and cities must (1) consider the minimum guidelines adopted by the Washington Department of Community, Trade, and Economic Development (DCTED),[9] (2) "include the best available science in developing policies and development regulations to protect the functions and values of critical areas,"[10] and (3) "give special consideration to conservation or protection measures necessary to preserve or enhance anadromous fisheries."[11]

This Article discusses the meaning of these latter two requirements: the requirements to include best available science and to give special consideration to the conservation of anadromous fisheries. Section II defines "best available science" by examining the fundamental characteristics of scientific information applied in the context of the GMA. Expanding on the work of a technical team convened by DCTED, this Article suggests an approach useful for identifying scientific information and assessing which of that information should be considered the "best available science." Section III concludes that the requirement of RCW 36.70A.172(1) to include best available science is a substantive requirement. Section IV explains the relationship between the two requirements in RCW 36.70A.172(1): the substantive requirement to include best available science and the requirement to give special consideration to anadromous fisheries.

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sion and Order, at 90 (Mar. 16, 1993). *Accord* English v. Board of Commissioners of Columbia County, EWGMHB No. 93-1-0002, Final Decision and Order, at 333 (Nov. 12, 1993). In contrast, the Western Washington Growth Management Hearings Board reviewed the pertinent statutory language and found "nothing in the Act that requires *or even allows* critical areas ordinances to be anything but permanent." North Cascades Audubon Soc'y v. Whatcom County, Western Washington Growth Management Hearings Board (WWGMHB) No. 94-2-0001, Final Order, at 520-21 (June 30, 1994). This conflict as to the character of critical areas regulations adopted prior to the comprehensive plan ultimately is moot because interim regulations protecting critical areas ultimately must be made permanent when the comprehensive plan is adopted. Bremerton v. Kitsap County/Port Gamble v. Kitsap County, CPSGMHB No. 95-3-0039c/97-3-0024c, Finding of Noncompliance and Determination of Invalidity, at 2664 (Sept. 8, 1997).

Page citations to Board decisions are as reported by Code Publishing Company, except where the decision has not been reported therein. Most decisions are also available at <http://www.cdlaw.com> and through Westlaw.

9. WASH. REV. CODE § 36.70A.170(2). The minimum criteria are found at chapter 365-190 of the 1999 Washington Administration Code.

10. WASH. REV. CODE § 36.70A.172(1).

11. *Id.*

B. Local Governments Must Include Best Available Science and Give Special Consideration to Anadromous Fisheries

In 1995, the Legislature added a new section to the GMA that raised the standard for designating and protecting critical areas:

> (1) In designating and protecting critical areas under this chapter, counties and cities shall include the best available science in developing policies and development regulations to protect the functions and values of critical areas. In addition, counties and cities shall give special consideration to conservation or protection measures necessary to preserve or enhance anadromous fisheries.
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> (2) If it determines that advice from scientific or other experts is necessary or will be of substantial assistance in reaching its decision, a growth management hearings board may retain scientific or other expert advice to assist in reviewing a petition under RCW 36.70A.290 that involves critical areas.[12]

RCW 36.70A.172 was derived from a recommendation of the Governor's Task Force on Regulatory Reform[13] intended to provide more specific policy direction to local governments and to the Growth Management Hearings Boards.[14] The articulated purpose of adopting

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12. WASH. REV. CODE § 36.70A.172; E.S.H.B. 1724, § 105, 54th Leg. (Wash. 1995), Act of May 15, 1995, ch. 347, § 105, 1995 Wash. Laws 1556. This section passed both houses of the Legislature unanimously. *See* Final Legislative Report, 54th Leg., at 121 (Wash. 1995).

13. *See* Final Legislative Report, 54th Leg., at 119 (Wash. 1995). Governor Lowry created the Task Force in August 1993 through Executive Order EO 93-06.

14. The GMA established three Growth Management Hearings Boards. *See* WASH. REV. CODE § 36.70A.250. The Eastern Washington Growth Management Hearings Board has jurisdiction over land use planning in all counties in Washington east of the crest of the Cascade Mountains. WASH. REV. CODE § 36.70A.250(1)(a). The Central Puget Sound Growth Management Hearings Board has jurisdiction over land use planning in the four counties of the central Puget Sound basin: King, Pierce, Snohomish, and Kitsap Counties. WASH. REV. CODE § 36.70A.250(1)(b). The Western Washington Growth Management Hearings Board has jurisdiction over land use planning in all other counties west of the crest of the Cascade Mountains. WASH. REV. CODE § 36.70A.250(1)(c). Their organization, membership, procedure, authority, and jurisdiction are set forth at RCW 36.70A.250-.290, .300-.302, and .310-.335. The Boards have adopted rules of procedure at chapter 242-02 of the 1999 Washington Administrative Code.

All three Boards have acknowledged the legislative determination that critical areas are so important that their protection must be ensured by the adoption of interim regulations until they can be designated and protected in the comprehensive plan and implementing development regulations. *See, e.g.*, Bremerton v. Kitsap County, CPSGMHB No. 95-3-0039, Final Decision and Order, at 1187-88 (Oct. 6, 1995); RIDGE v. Kittitas County, EWGMHB No. 94-1-0017, Order on Dispositive Motions, at 165 (June 11, 1994); Twin Falls v. Snohomish County, CPSGMHB No. 93-3-0003, Order on Dispositive Motions, at 390-91 (May 23, 1993).

Growth Management Hearings Boards are authorized to hear and decide petitions alleging:

RCW 36.70A.172(1) was to clarify the state's goals and policies for protecting critical areas under the GMA.[15] Arguably, the statute succeeded in accomplishing that purpose. However, because the Legislature, apparently following the Task Force's lead,[16] elected not to establish specific state or regional standards for critical areas or to identify acceptable sources of scientific evidence, the statute still creates uncertainty for local governments and for the Growth Management Hearings Boards: What is "best available science"? How and where does a local government or interested person obtain it? Must the local government obtain "best available science" itself, or may the local government simply rely on information provided by persons participating in the local government's process to adopt critical areas regulations? What does it mean to "include" best available science?

C. Administrative Interpretation of RCW 36.70A.172(1)

In September 1998 DCTED convened a technical team to discuss the meaning of the requirements in RCW 36.70A.172(1). The team, which met approximately six times over three months, was comprised of scientists and planners from the Washington Departments of Ecology, Fish and Wildlife, Natural Resources, and other state resource agencies, as well as land use planners from DCTED. Planners and scientists from local governments participated as their

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(1) that a state agency or local government planning under the GMA is not in compliance with the requirements of the GMA, with the Shoreline Management Act (WASH. REV. CODE ch. 90.58) as it relates to the adoption or amendment of shoreline master programs, or the State Environmental Policy Act (WASH. REV. CODE ch. 43.21C) as it relates to the adoption or amendment of comprehensive plans and development regulations; or (2) that the twenty-year growth management planning population projections adopted by the Washington Office of Financial Management under RCW 43.62.035 should be adjusted. WASH. REV. CODE § 36.70A.280(1).

15. The GMA requires all local governments to provide for the protection of certain critical areas. Because of the state's interest in these areas, the Legislature must establish clear direction on the state's goals and policies for the protection of these areas. This direction should be given by requiring local governments to use the best available science when designating and protecting critical areas. Special consideration should be given to efforts to protect anadromous fish resources. The Growth Management Hearings Boards (GMHBs) should be allowed to retain scientific expertise when necessary to evaluate critical areas development.

GOVERNOR'S TASK FORCE ON REGULATORY REFORM, FINAL REPORT 37 (Dec. 20, 1994).

16. The Task Force discussed whether to recommend the establishment of specific state or regional standards for critical areas based on scientific information assembled by an expert panel or through a public process. This idea was rejected, in part because of the "significant delay" while standards were developed and local governments brought their development regulations into compliance. GOVERNOR'S TASK FORCE ON REGULATORY REFORM, *supra* note 15, at 38-39.

schedules permitted. Other planners and scientists were invited, but were unable to attend.

The objective assigned to the technical team was to determine whether it could achieve consensus as to how the above questions should be answered. If there was consensus, or at least general agreement on these issues, the second objective was to consider whether it would be helpful to local governments, state agencies, the Growth Management Hearings Boards, and the courts if DCTED were to adopt an administrative rule interpreting the requirements of RCW 36.70A.172(1). To provide public notice and preserve the option to adopt a rule, DCTED filed a Preproposal Statement of Inquiry, pursuant to RCW 34.05.310, on October 7, 1998.

In December 1998, the technical team agreed on a discussion paper summarizing its recommended approach to interpreting the requirements of RCW 36.70A.172(1). There was no consensus on what form a rule should take if one were to be adopted, and there was no formal recommendation from the technical team as to whether a rule should be adopted.

During the first week of January 1999, DCTED sent copies of the discussion paper to interested parties around the state and then held a number of meetings with local government officials and staff, tribal representatives, environmental advocates, representatives of development interests, and others to hear their comments and reactions and to answer questions. Additional meetings were scheduled through the spring and summer of 1999.

II. WHAT IS "BEST AVAILABLE SCIENCE"?

The GMA does not answer this question. Furthermore, because DCTED's Minimum Guidelines were adopted before RCW 36.70A.172 was added to the GMA, they provide only indirect assistance.[17] Although the Growth Management Hearings Boards have discussed what it means to "include" best available science, they have not seriously attempted to define what constitutes best available science. The Eastern Washington Growth Management Hearings Board has simply used the term without attempting to define it.[18] The Central Puget Sound Growth Management Hearings Board has deferred to local governments to determine what information constitutes best

17. *See* WASH. ADMIN. CODE § 365-190-080 (1999). This rule was adopted in 1991 and has not been amended since its adoption.

18. *See* Moore v. Whitman County, EWGMHB No. 96-1-0005, Order on Compliance, at 2488-89 (May 23, 1997); Easy v. Spokane County, EWGMHB No. 96-1-0016, Final Decision and Order, at 2380-82 (Apr. 10, 1997); Woodmansee v. Ferry County, EWGMHB No. 95-1-0010, Final Decision and Order, at 2069-70 (May 13, 1996).

available science.[19] The Western Washington Growth Management Hearings Board similarly has not attempted to define "science," but, recognizing the limits GMA imposes on local discretion, has discussed the meaning of "best available":

> Local diversity has an impact in determining what is the "best" science. The goals of the Act, the practicality of the "science" and the fiscal impact, relating to the availability of information and to the ultimate decision, must be balanced by a local government in determining how to designate and how to protect critical areas. "Available" means not only that the evidence must be contained within the record, but also that the science must be practically and economically feasible. "Best" means that within the evidence contained in the record a local government must make choices based upon the scientific information presented to it. The wider the dispute of the scientific evidence, the broader the range of discretion allowed to local governments. Ultimately, a local government must take into account the practical and economic application of the science to determine if it is the "best available."[20]

Federal courts that have had the opportunity to consider the meaning of best available science as used in the Endangered Species Act[21] and in the Magnuson Act[22] have not done so. Rather than apply a precise definition, federal courts generally have examined the amount and quality of science available in light of agencies' statutory responsibilities. They have held, for example, that the Magnuson Act permits agency action to conserve and rebuild fish stocks even though the science is "unsettled,"[23] and that the Endangered Species Act

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19. Tulalip Tribes of Washington v. Snohomish County, CPSGMHB No. 96-3-0029, Order on Motions, at 2453-54 (Oct. 2, 1996); Honesty in Environmental Analysis and Legislation (HEAL) v. City of Seattle, CPSGMHB No. 96-3-0012, Final Decision and Order, at 2024-27 (Aug. 21, 1996).

20. Clark County Natural Resources Council v. Clark County, WWGMHB No. 96-2-0017, Final Decision and Order, at 2209 (Dec. 6, 1996).

21. *See* 16 U.S.C. § 1536(a)(2) (1998). The Endangered Species Act actually contains a series of requirements to use science in decision-making. *See* 16 U.S.C. §§ 1533(a)(1), 1533(b)(1)(A), 1533(b)(2), 1533(b)(3)(A), 1533(b)(3)(D)(i), 1533(b)(6)(B)(i), 1533(b)(7), 1536(a)(2), 1536(c)(1), 1536(h)(2)(B).

22. *See* 16 U.S.C. §§ 1851(a)(2), 1853(a)(1)(c) (1998).

23. *See, e.g.*, Southern Offshore Fishing Ass'n v. Daley, 995 F. Supp. 1411, 1429 (M.D. Fla. 1998) (holding that because agency is charged with conserving and rebuilding fish stocks, it may exercise its statutory discretion in the face of unsettled science and data, and reasonably select from an array of reasoned choices). *Accord* Parravano v. Babbitt, 837 F. Supp. 1034, 1046 (N.D. Cal. 1993), *aff'd*, 70 F.3d 539 (9th Cir. 1995), *cert. denied*, 518 U.S. 1016 (1996); J.H. Miles & Co. Inc. v. Brown, 910 F. Supp. 1138, 1152 (E.D. Va. 1995); Organized Fishermen of Florida v. Franklin, 846 F. Supp. 1569, 1577 (S.D. Fla. 1994); National Fisheries Institute v. Mosbacher, 732 F. Supp. 210, 220 (D.D.C. 1990). *See also* Massachusetts v. Daley, 170 F.3d

requires federal agencies to proceed with listing decisions, biological opinions, and other actions to protect listed species even though the scientific evidence is "weak" or inconclusive.[24]

Rather than attempting to define the best scientific and commercial data available, the National Marine Fisheries Service and the United States Fish and Wildlife Service jointly adopted a policy statement "to provide criteria, establish procedures, and provide guidance to ensure that decisions made by the Services under the authority of the Endangered Species Act of 1973 (ESA), as amended represent the best scientific and commercial data available."[25]

Having reviewed the various ways in which the Boards, the courts, the federal agencies, and others used and referenced best available science and analogous standards, DCTED's technical team determined there was no commonly accepted understanding of the meaning

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23, 28-30 (1st Cir. 1999) (holding that if no better information is available, then what is available is the best, and the assertion that best available science was not included must be rejected).

24. *See, e.g.*, Greenpeace Action v. Franklin, 14 F.3d 1324, 1336 (9th Cir. 1992) (holding that reliance on the analysis and opinion of experts and use of the best evidence available, even though the evidence is "weak" and thus not dispositive, does not render the agency's determination arbitrary and capricious); Conner v. Burford, 848 F.2d 1441, 1453-54 (9th Cir. 1988), *cert. denied sub nom.* Sun Exploration and Production Co. v. Lujan, 489 U.S. 1012 (1989) (holding that the Endangered Species Act's mandate that listing decisions be based on the best scientific information available requires the Agency to consider the scientific information presently available to ensure that protected species are not jeopardized; neither incomplete information about a proposed action nor inconclusive biological information justified a failure to do so). *Accord* Defenders of Wildlife v. Babbitt, 958 F. Supp. 670, 680 (D.D.C. 1997). *But see* Roosevelt Campobello International Park Comm'n v. U.S. Envtl. Protection Agency, 684 F.2d 1041, 1055 (1st Cir. 1982) (holding that, in making jeopardy determination during consultation, the Agency must collect all "practicable" data).

25. Endangered and Threatened Wildlife and Plants: Notice of Interagency Cooperative Policy on Information Standards Under the Endangered Species Act, Notice of Policy Statement, 59 Fed. Reg. 34271 (1994). Like local governments, the Services receive anecdotal and oral information, as well as information found in documents such as published articles in peer-reviewed professional journals, status surveys, biological assessments, and other unpublished materials from state and federal agencies, state natural heritage programs, tribal governments, consulting firms, contractors, and academic scientists. Because "[t]he reliability of the information contained in these sources can be as variable as the sources themselves," the Service biologists must review any information used by the Services to implement the ESA to ensure it is "reliable, credible, and represents the best scientific and commercial data available." *Id.* To ensure reliable information is used, Service biologists also must "gather and impartially evaluate biological, ecological, and other information that disputes official positions, decisions, and actions proposed or taken by the Services during their implementation of the Act," "document their evaluation of information that supports or does not support a position being proposed as an official agency position" and, "to the extent consistent with the use of the best scientific and commercial data available, use primary and original sources of information as the basis for recommendations." *Id.*

"Primary" scientific literature means experimental or observational research studies, as distinguished from scholarly reviews, treatises, and the like. Analogized to the law, relying on primary literature in science is akin to reading the cases for oneself rather than relying on a law review article.

of best available science. More often than not, it has been used more as a conclusion than as a standard to guide a process, which has left local governments with uncertainty as to how to find and apply best available science. To assist in resolving this uncertainty, the technical team determined that the phrase "best available science" is most meaningfully considered in two parts: asking first what is "science," then what is "best available" science.

A. What Is "Science"? How Do You Know It When You See It?

Philosophers of science have discussed this question for decades and have published literally thousands of books and scholarly papers on the subject.[26] This is not the place to review that literature. However, a very brief summary of the methodology of science is in order to provide context for understanding the recommendations of DCTED's technical team regarding the inclusion of best available science in the protection of critical areas under the GMA.

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26. Unfortunately, few accessible starting points into the contemporary philosophy of science exist for the nonspecialist. The following are recommended because their discussions are especially relevant to the kinds of scientific studies relevant to the designation and protection of critical areas: FRANCISCO J. AYALA & THEODOSIUS DOBZHANSKY, EDS., STUDIES IN THE PHILOSOPHY OF BIOLOGY: REDUCTION AND RELATED PROBLEMS (1974); MICHAEL T. GHISELIN, THE TRIUMPH OF THE DARWINIAN METHOD (1969); CLARK GLYMOUR, THEORY AND EVIDENCE (1980); DAVID HULL, PHILOSOPHY OF BIOLOGICAL SCIENCE (1974); ERNST MAYR, THE GROWTH OF BIOLOGICAL THOUGHT: DIVERSITY, EVOLUTION, AND INHERITANCE (1982) (see especially chapter 2); MICHAEL RUSE, PHILOSOPHY OF BIOLOGY (1974). In addition, the following works focus primarily on the physical sciences (especially chemistry and physics) and are considered modern classics in the philosophy of science: THOMAS S. KUHN, THE STRUCTURE OF SCIENTIFIC REVOLUTIONS (2d. ed. 1970); PETER B. MEDAWAR, THE ART OF THE SOLUBLE (1967); ERNST NAGEL, THE STRUCTURE OF SCIENCE: PROBLEMS IN THE LOGIC OF SCIENTIFIC EXPLANATION (1961); KARL R. POPPER, THE LOGIC OF SCIENTIFIC DISCOVERY (1968). The following article contains an excellent and authoritative discussion of the nature of science in a legal context: Bert Black, Francisco J. Ayala, & Carol Saffron-Brinks, *Science and the Law in the Wake of Daubert: A New Search for Scientific Knowledge*, 72 TEX. L. REV. 715, 750-86 (1994). The second author, Dr. Ayala, is a highly regarded population geneticist, Professor of Biology at the University of California at Irvine, member of the National Academy of Sciences, and author of scores of scientific books and papers. *See also* Holly Doremus, *Listing Decisions Under the Endangered Species Act: Why Better Science Isn't Always Better Policy*, 75 WASH. U.L.Q. 1029, 1057-87 (1997). Dr. Doremus, who is a faculty member of the law school of the University of California at Davis, also holds a Ph.D. in plant biology.

1. The Scientific Method[27]

Science is a process—a set of methods used to understand the workings of the natural world. The value of this process is that it produces reliable information that provides a foundation for producing further information.[28] Scientists employ a variety of methods in their attempts to understand the structure and functioning of the universe and its components. Using a diversity of methods is necessary because different scientific disciplines study such different subjects. Despite the diversity of methods, one basic procedure underlies most modern scientific inquiry. Known formally as the *hypothetical-deductive model*, and informally as the *scientific method*, it consists of four stages: making observations, forming hypotheses, making predictions[29] from those hypotheses, and testing those predictions. Testing predictions generates new observations, which begins a new cycle in the model.

All science progresses by formulating and reformulating hypotheses and testing them by observation and experiment. A hypothesis may be expressed verbally or mathematically, but all hypotheses, no matter how linguistically or mathematically sophisticated, are deliberate oversimplifications of nature. They are not meant to describe the complexities of the natural world, but to abstract the most general and important features of a particular part of the natural world.

A first principle of scientific inquiry is *falsifiability*. A scientific hypothesis must have observational consequences that could prove the hypothesis to be mistaken. In other words, to test a hypothesis, a scientist must perform experiments or conduct observations that are capable of disproving the hypothesis.[30] Fundamental to scientific

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27. This explication of the scientific method is a product of the author's knowledge, training, and experience, and it fairly reflects the consensus of DCTED's technical team as reflected in its discussions. For further information and additional descriptions of the scientific method, see the sources cited *supra* note 26.

28. Doremus, *supra* note 26, uses the metaphor of a staircase to explain this iterative process:

> Science thus builds toward ever greater knowledge by a process resembling the construction of a staircase. Data serve as the raw materials. Scientists use those materials to create a step, reinforcing it until it can bear the weight of the scientific community's skepticism. When the step is strong enough, the community climbs onto it, and begins constructing the next step. Occasionally a step collapses and must be rebuilt. Scientific knowledge thus evolves over time.

Doremus, *supra* note 26, at 1058.

29. The essence of prediction is that it generates an expectation that was not there previously. Whether the expectation concerns the past or the future is irrelevant. For example, based on hypotheses about geological strata and ancient biogeography, a paleontologist may predict where fossils of certain types are likely to have been deposited.

30. As explained by Black et al., *supra* note 26, the distinction between efforts to *prove* a

inquiry is that a given hypothesis is accepted as provisionally true only if sufficient credible attempts to disprove it have failed. If, because of its logical structure or subject matter, a hypothesis can never be disproved, it is not a scientific hypothesis and cannot generate legitimate scientific inquiry.[31]

A second principle is *replication*. Because science is inherently a skeptical inquiry, a single confirmation of a hypothesis rarely leads to its widespread acceptance in the relevant scientific community. "No matter how clever and brilliant a hypothesis might be, it must undergo corroboration through critical examination and empirical testing."[32] Similarly, a single refutation of a hypothesis may not lead to its rejection, because there is always a possibility of experimental error or mistaken interpretation. The hypothesis is accepted or rejected only tentatively until the confirming or rejecting evidence or observations are replicated by additional tests, or validated by further predictions and testing in reliance on the initial results.[33] The degree of corroboration does not depend solely on the number of additional tests, but on their variety and severity.[34]

The validation or rejection of a hypothesis is a public activity conducted by a community of scientists who probe and verify or refute each other's work. The usual method by which this public activity is conducted is through a peer review system. As a routine matter, a scientist must have a research proposal reviewed by his or her peers (*i.e.*, other scientists with a working knowledge of the particular scientific discipline) in order to obtain funding to conduct the research. Once a given research project is completed, the results generally must be pub-

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hypothesis versus *disproving* the hypothesis is crucial to an understanding of scientific reasoning:

> The logical nature of universal statements creates an asymmetry between falsifiability and verifiability. A universal statement can be shown to be false if it is found inconsistent with even one singular statement about a particular event or occurrence. But the reverse is not true; a universal statement can never be proven true by virtue of the truth of particular statements, no matter how numerous.
>
> . . . Thus no hypothesis can ever be proven absolutely true, but a hypothesis may become well corroborated if it survives a variety of tests that fail to falsify it.

Black et al., *supra* note 26, at 755-56.

31. *See* Daubert v. Merrell Dow Pharmaceuticals, 509 U.S. 579, 593 (1993) ("Scientific methodology today is based on generating hypotheses and testing them to see if they can be falsified; indeed, this methodology is what distinguishes science from other fields of human inquiry.") (citing Michael D. Green, *Expert Witnesses and Sufficiency of Evidence in Toxic Substances Litigation: The Legacy of Agent Orange and Bendectin Litigation*, 86 NW. U. L. REV. 643, 645 (1992)).

32. Black et al., *supra* note 26, at 757, 776-77.

33. *See id.* at 784.

34. *Id.* at 762. A "severe" test, one that "pushes a hypothesis to its limits rather than reexamining the paradigmatic case around which it was formulated," provides the most valuable information about a hypothesis. *Id.* at 763.

lished in a peer-reviewed journal to be accepted in the relevant scientific community. Both rounds of peer review are intended to ensure the research is well-designed and the observations and conclusions reliable.[35]

Inherent in the notion of validation or replication is a third principle of scientific inquiry: *contingency*. Every validated hypothesis still has tentative status—it always is subject to being disproved as new evidence becomes available. On the other hand, the greater the amount of evidence supporting a given hypothesis, the more confidence it generates. Furthermore, the more significant or controversial the hypothesis, the greater scrutiny it will receive.

A fourth principle is *explanatory power* (also called *predictive success*).[36] Hypotheses have no scientific use unless they generate predictions. If the predictions are validated, the hypothesis may be said to have explanatory power. Hypotheses with high explanatory power ultimately are synthesized into "theories." In science, a "theory" has a more formal meaning than in everyday language. A scientific theory is a body of interconnected statements that make sense of and explain a vast body of scientific knowledge, including both well-validated hypotheses and the evidence and observations supporting those hypotheses. A scientific theory also may include logical inferences, for which there is not any immediate proof, that bind together the elements of the theory.[37] Like the hypotheses that support it, a scientific theory is tentative and subject to revision or replacement as new evidence is generated and new hypotheses are tested. Even so, some scientific theories are supported by such overwhelming evidence that they are broadly accepted in the scientific community, so much so that in common parlance they may be referred to as scientific "laws."

A final principle is *generalization*. In general, scientific theories earn their laurels by solving problems and suggesting new inquiries. Therefore, a scientific theory should be coherent and internally consistent, consisting of one or a small set of explanations and problem-solving strategies that have the ability to resolve all or most of the relevant problems in the intended domain of the theory. The theory succeeds as it can be generalized—as it is shown to encompass more and more problem areas.

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35. "The peer-review system represents both an effort to police scientific claims and to assure their widest possible dissemination." *Id.* at 777. *See also* Doremus, *supra* note 26, at 1061-63.

36. *See* Black et al., *supra* note 26, at 783.

37. For example, the atomic theory of matter was formulated before there was direct evidence for the existence of atoms. Similarly, genes as discrete units of heredity were posited in theories about genetics long before their structure and physical nature were discovered.

2. Characteristics Useful for Determining Whether Particular Information Is "Science" Under RCW 36.70A.172(1)

In an ideal world, a local government developing regulations to protect critical areas would have available abundant, complete, authoritative, and directly applicable scientific information on which to rely. The DCTED technical team recognized, however, that local governments frequently must make regulatory decisions before scientists have completed their research. For example, a county may be required to designate and protect fish and wildlife habitat conservation areas pursuant to RCW 36.70A.060 and 36.70A.170, giving special consideration to anadromous fisheries under RCW 36.70A.172(1), before scientists have conclusively analyzed the habitat requirements for riparian areas that must be designated and protected. In this type of circumstance, how does the local government ensure that it is obtaining valid and reliable scientific information as required by RCW 36.70A.172(1)?

The technical team concluded that RCW 36.70A.172(1) requires each local government first to determine whether the information and testimony it obtains or receives is scientific information.[38] Generally speaking, scientific information is that information derived using the scientific method described above, but the technical team recognized that well-validated, authoritative scientific studies directly addressing a local government's concerns are rare. Recognizing the imperfect state of knowledge available to local governments, the technical team developed a list of six characteristics local governments may use to determine whether particular information may be considered science for purposes of RCW 36.70A.172(1):

(1) *Peer review.* Has the information been critically reviewed by other persons who are experts in that scientific discipline?[39] Have the criticisms of the peer reviewers been addressed by the proponents of the information? Publication in a refereed scientific journal usually indicates that the information has been appropriately peer-reviewed.[40]

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38. Information obtained or received by local governments that is not "scientific" logically can never qualify as "best available science." Therefore, there must be an initial assessment as to whether the information at hand is scientific information.

39. *See* Daubert v. Merrell Dow Pharmaceuticals, 509 U.S. 579, 593 (1993) (holding that peer review "is a component of 'good science,' in part because it increases the likelihood that substantive flaws in methodology will be detected").

40. *See* Black et al., *supra* note 26, at 777 (citations omitted):

> Publication in a peer-reviewed journal does not by itself guarantee the validity of the published results, nor is there any reason for outright rejection of unpublished work or work not published in a reputable journal. But one should treat with great suspicion a

(2) *Methods.* Are the methods that were used to obtain the information clearly stated and able to be replicated? Are the methods standardized in the pertinent scientific discipline? If not, have they been appropriately peer-reviewed to assure their reliability and validity?[41]

(3) *Logical conclusions and reasonable inferences.* Are the conclusions presented based on reasonable assumptions supported by other studies and consistent with the general theory underlying the assumptions?[42] Are the conclusions logically and reasonably derived from the assumptions and supported by the data presented?[43] Are any gaps in information and inconsistencies with other pertinent scientific information adequately explained?

(4) *Statistical analysis.* Have the data been analyzed using appropriate statistical methods?[44]

(5) *Context.* Is the information placed in context? Are the assumptions, analytical techniques, data, and conclusions appropriately framed with respect to the prevailing body of pertinent scientific knowledge?[45]

(6) *References.* Are the assumptions, analytical techniques, and conclusions well-referenced with citations to relevant, credible literature and other pertinent existing information?

Generally speaking, as more of these characteristics of valid scientific processes exist in an information source, it is more likely that information from that source is reliable and valid scientific information. The technical team recognized, however, that valid scientific information may be derived from sources not exhibiting all of the

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scientifically significant proposition that has not been submitted for publication and has not successfully undergone review.

41. The objective is to reveal any possible errors in the methods used. "A poorly performed or improperly interpreted experiment can falsify a valid hypothesis or corroborate one that is invalid." Black et al., *supra* note 26, at 774-75.

42. *See* Black et al., *supra* note 26, at 759-60.

43. *See id.* at 773-74.

44. One reason statistical methodologies have such important utility in testing hypotheses in science is because they incorporate the asymmetry between verification and falsification, referenced *supra* note 30. *See* Black et al., *supra* note 26, at 756. In addition, they objectively measure the reliability of scientific data. Doremus, *supra* note 26, at 1070. Nevertheless, the technical team recognized that some types of scientific data are valid even though not readily amenable to statistical analysis.

45. *See* Black, *supra* note 26, at 759-60. "Scientific knowledge tends to be cumulative and progressive, and a hypothesis that is not consistent with accepted theories should be regarded with great caution, whether or not the hypothesis ultimately proves to be true." *Id.* at 784.

above characteristics. As a benchmark for evaluation, the technical team therefore listed several common types of sources from which purported scientific information may be derived. The technical team recommended that information from each of the following sources of scientific information should be considered valid and reliable if the source exhibits the indicated characteristics of science:[46]

(a) A *research study* is the archetype of the scientific method, where data are collected as part of a controlled experiment[47] to test a specific hypothesis, culminating in a published research paper. To be considered valid and reliable, a research study generally must exhibit all six characteristics described above: peer review, reliable methodology, logical conclusions and reasonable inferences, appropriate statistical analysis, a defined context, and adequate references.

(b) A *monitoring study* usually involves the collection of data periodically over time to gauge the ongoing status of a particular system or process or the effectiveness of a management program. To be considered valid and reliable, a monitoring study generally must exhibit reliable methodology, logical conclusions and reasonable inferences, a defined context, and adequate references. The study is strengthened by appropriate statistical analysis, especially if trends are to be described.

(c) An *inventory* is the collection of data from an entire population in a given area (*e.g.*, all individuals in a particular plant or animal species in a watershed) or from an entire ecosystem or ecosystem component (*e.g.*, the species in a particular wetland).[48] An inventory generally must exhibit the

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46. The technical team was not motivated only by a desire to assist local governments in distinguishing scientific information from nonscientific information; additionally, the technical team sought to delineate characteristics and sources of scientific information to assist local governments in assessing the reliability of different types of scientific data. *See* Doremus, *supra* note 26, at 1064-65 ("[T]he reliability of scientific information varies widely as the information progresses through the successive stages of the scientific process. Scientific information ranges from robustly confirmed knowledge to raw hunches.").

47. Valid scientific data to test hypotheses may be collected in ways other than controlled experiments. Although a discussion of alternative data collection techniques is well beyond the scope of this Article, it is worth noting that in some scientific disciplines, such as geology and astronomy, controlled experiments are rarely possible or practical, and predictions frequently are tested using observational analysis or mathematical models. Similarly, in some branches of biology, comparative analysis is used effectively to test hypotheses that are not susceptible to controlled experiment. *See* Doremus, *supra* note 26, at 1059-61.

48. Also appropriately evaluated as inventories are certain mapping activities, such as the mapping of surficial geology (useful in designating critical aquifer recharge areas), liquefaction zones (useful in designating geologically hazardous areas), or 100-year floodplains (useful in

same characteristics as a monitoring study to be considered valid and reliable.

(d) A *survey* is the collection of data from a statistical sample of a population or ecosystem or ecosystem component. A survey generally must exhibit the same characteristics as a monitoring study to be considered valid and reliable. If a survey is to be used to estimate the composition of an entire population or system, appropriate statistical analysis is required.

(e) *Modeling* is the mathematical or symbolic simulation or representation of a natural system. Models generally are used to understand and explain occurrences that cannot be directly observed or to generate predictions that can be tested in a research study. To be considered valid and reliable, a model generally must exhibit the same characteristics as a research study.

(f) An *assessment* is an inspection and evaluation of site-specific information by a qualified scientific expert that may or may not involve new data collection. To be considered valid and reliable, an assessment generally must exhibit reliable methodology, logical conclusions and reasonable inferences, a defined context, and adequate references.

(g) A *synthesis* is a comprehensive review and presentation of pertinent literature and other relevant ambient knowledge by a qualified scientific expert, which may include recommendations for management or further research derived from the review. To be considered valid and reliable, a synthesis generally should exhibit peer review, reliable methodology, logical conclusions and reasonable inferences, a defined context, and adequate references.

(h) An *expert opinion* is the statement of a qualified scientific expert based on his or her best professional judgment and experience in the pertinent scientific discipline; the opinion may or may not be based upon site-specific information. To be considered valid and reliable, an expert opinion must exhibit logical conclusions and reasonable inferences, and a defined context.

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designating frequently flooded areas).

Whether a person is a qualified scientific expert should be determined by the person's professional credentials and certification, the extent of formal training and any advanced degrees earned in the pertinent scientific discipline, the number of years of experience in the pertinent scientific discipline, and the extent to which the person has authored papers published in peer-reviewed journals or other professional literature.[49] No one factor should be determinative.

In addition, information may be properly considered scientific information even though obtained from a source not exhibiting the characteristics identified by DCTED's technical team. Such information, however, probably should be afforded less weight than information developed from a source exhibiting all of the indicated scientific characteristics.

The technical team discussed three additional sources of information commonly received by local governments considering critical areas ordinances:

(a) *Anecdotal information* is the reporting of one or more observations which are not part of an organized scientific effort (*e.g.*, "I have hiked in that area for years and have never seen a grizzly bear there.").

(b) *Non-expert opinion* is the opinion of a person who is not a qualified scientific expert in a pertinent scientific discipline (*e.g.*, "I do not believe there are grizzly bears in that area.").

(c) *Hearsay*, in this context, is information repeated from verbal communication with others (*e.g.*, "At a lecture last week, Dr. Smith said there were no grizzly bears in that area.").

In the technical team's assessment, these information sources typically do not produce "scientific" information because they do not possess the necessary characteristics for scientific validity and reliability. Information from these sources may provide valuable information to supplement best available science, especially if the source of the information has sufficient experience or credibility to suggest the information is reliable and valid. However, because information from these sources is often unreliable, such information should be discounted if it is contrary to information obtained or received from valid and reliable scientific sources.

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49. This standard recommended by the technical team arguably is a higher standard than that for qualifying an expert witness under WASH. R. EVID. 702 or FED. R. EVID. 702.

Once a local government has identified which of the information in its possession can be considered "scientific" information, it can move to the next step of the analysis: determining which, if any, of that scientific information is the "best available" relevant to the planning issues at hand.

B. *How Do You Know When You've Got the "Best Available" Science? Whose Obligation Is It to Get It?*

The technical team correctly recognized that "best available" science seldom, if ever, consists of a single scientific document. Nor does best available science mean "perfect" science—there is no requirement that best available scientific information must be dispositive of the planning issues it addresses. Rather, the phrase refers to all valid, reliable, and pertinent scientific information reasonably available to a local government.

The technical team's interpretation is consistent with the prevailing interpretation of analogous language in federal statutes. As noted above, statutory requirements to include best available science have been interpreted to allow or require agency action when scientific information is unsettled, incomplete, or inconclusive; when no better information is available; and when the agency action furthers the general conservation-oriented mandate of the agency (*e.g.*, setting conservative harvest limits under the Magnuson Act, or issuing a biological opinion under the Endangered Species Act).[50] Implicit in these cases is a judicial assumption that the available scientific information is sufficiently reliable to ensure that the agency is not acting unintelligently or haphazardly.[51]

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50. *See* cases cited *supra* notes 23 and 24. *See also* Southwest Ctr. for Biological Diversity v. U.S. Bureau of Reclamation, 143 F.3d 515 (9th Cir. 1998). The court concluded that the Secretary's analysis in formulating a reasonable and prudent alternative under 16 U.S.C. § 1536(a)(2) is not explicitly limited to apolitical considerations by the requirement that the Secretary must rely on "the best scientific and commercial data available"; therefore, if two proposed alternatives would avoid jeopardy to a listed species, the Secretary may choose the one that best suits the action agency's political and business interests. *Id.* at 523 n.5. Explicit in this holding is the requirement that both alternatives would avoid jeopardy—*i.e.*, both are appropriately rooted in the best available science.

51. *See, e.g.*, Bennett v. Spears, 520 U.S. 154 (1997), in which the Supreme Court discussed the intent of the requirement in the Endangered Species Act, at 16 U.S.C. § 1536(a)(2), that NMFS or USFWS "use the best scientific and commercial data available" in preparing a Biological Opinion:

> The obvious purpose of the requirement that each agency "use the best scientific and commercial data available" is to ensure that the ESA not be implemented haphazardly, on the basis of speculation or surmise. While this no doubt serves to advance the ESA's overall goal of species preservation, we think it readily apparent that another objective (if indeed not the primary one) is to avoid needless economic dislocation produced by agency officials zealously but unintelligently pursuing their envi-

Therefore, before a local government can "include" best available science in the development of policies and development regulations to protect the functions and values of critical areas, two tasks must be accomplished. First, someone must identify and assemble scientific information that appears to relate to the planning issues at hand. Second, someone must evaluate the assembled scientific information to determine which of it is reliable and pertinent to the planning issues at hand—that is, which of the assembled information is the "best available" science. These two tasks probably can be accomplished most efficiently and effectively by a qualified scientific expert (or better yet, a team of qualified scientists) in consultation with or as a member of the local government's planning staff.[52]

1. How and Where Does a Local Government Obtain Scientific Information?

All three Growth Management Hearings Boards have held that local governments must "show their work" when adopting policies and regulations to designate and protect critical areas.[53] In other words, local governments must create a record containing the information relied upon in the development and adoption of those policies and regulations. Before scientific information can be "included" in the development of policies and regulations to protect the functions and values of critical areas, it must be made part of the record created by the local government.

RCW 36.70A.172(1) does not specify who has the obligation of seeking out scientific information for inclusion in the record. Must a local government affirmatively identify and assemble pertinent scientific information to support its development of critical areas policies and regulations? Or may a local government rely on whatever scientific information is provided to it by public participants in the plan-

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ronmental objectives.

Id. at 176-77. *Accord* HEAL v. Central Puget Sound Growth Management Hearings Bd., 979 P.2d 864, 869-70 (Wash. Ct. App. 1999).

52. The technical team did not intend that the characteristics of valid scientific processes, discussed in the preceding section of this article, should be used by local officials as a substitute for consultation with a qualified scientific expert or a team of qualified scientists. Rather, the list of characteristics was intended to assist local officials (and the public) to understand why certain information or testimony is considered "scientific," while other information and testimony is not and why the "scientific" information is given special status under RCW 36.70A.172(1).

53. *See, e.g.*, HEAL v. City of Seattle, CPSGMHB No. 96-3-0012, Final Decision and Order, at 2027 (Aug. 21, 1996); Clark County Natural Resources Council v. Clark County, WWGMHB No. 96-2-0017, Final Decision and Order, at 2381 (Dec. 6, 1996); Easy v. Spokane County, EWGMHB No. 96-1-0016, Final Decision and Order, at 2208-09 (Apr. 10, 1997).

ning process? Where the critical areas policies and regulations provide a process for iterative development of best available science, perhaps as part of a permitting process, is the burden on project proponents to assemble and provide scientific information to the local government? If so, is there a similar burden on project opponents, and is there any presumption that must be overcome by proponents or opponents?

Because the record developed by the local government forms the basis for any review of the local government's policies and regulations adopted to protect critical areas,[54] the prudent course of action for a local government is to take the initiative to see that the best available science is in the record. It is fundamental that the more informed the decisionmaker, the better the decision. Moreover, a local government that attempted or allowed itself to remain ignorant of scientific information bearing on its critical areas would be acting contrary to RCW 36.70A.172(1), contrary to the clear intent of the GMA that reliable information be developed and acted upon, contrary to the GMA's requirement of open and continuous public participation in the planning process,[55] and contrary to DCTED's Minimum Guidelines adopted under RCW 36.70A.050.[56] Given these requirements in the GMA, a local government that intentionally remains ignorant of pertinent scientific information is unlikely to prevail if challenged before a Growth Management Hearings Board.[57]

Pertinent scientific information is available from state and federal agencies with expertise in the science implicit in designating and pro-

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54. WASH. REV. CODE §§ 36.70A.290(4), .295(4)(a), .320(3); §§ 34.05.558, .566. *See also* City of Redmond v. Central Puget Sound Growth Management Hearings Bd., 136 Wash. 2d 38, 45, 959 P.2d 1091, 1093 (1998) (holding that a court reviews the record developed by the local government that was before the Board). *Accord* King County v. Central Puget Sound Growth Management Hearings Bd., 91 Wash. App. 1, 12, 951 P.2d 1151, 1157 (1998), *aff'd in part, rev'd in part on other grounds*, 979 P.2d 374 (Wash. 1999); Manke Lumber Co. v. Western Wash. Growth Management Hearings Bd., 91 Wash. App. 793, 810, 959 P.2d 1173, 1182 (1998).

55. *See* WASH. REV. CODE § 36.70A.035, .140.

56. *See* WASH. ADMIN. CODE § 365-190-040, -080 (1999).

57. *See, e.g.*, Advocates for Responsible Dev. v. City of Shelton, WWGMHB No. 98-2-0005, Final Decision and Order (Aug. 10, 1998). The City of Shelton identified three categories of critical aquifer recharge areas, but determined the general location of only two of the categories. The third category was neither designated nor protected. The Western Board held that the city's failure to set a course of action and timeline for studying, designating, and protecting the third category of critical aquifer recharge areas (CARAs) did not comply with the GMA. *Id.* at 3019. The Western Board apparently agreed with the petitioners' following contention:

> The City appears to be taking the position that it can comply with the act by neither conducting further investigation, nor designating, nor regulating Class III CARAs. If this position were correct, then local governments might escape the mandate of the law simply by remaining as ignorant as possible about their critical areas. That is plainly not the intent of the law. If it were, the law would be a sham, requiring only the shuffling of paper, but no real protection of natural resources.

Id. at 3021.

tecting critical areas under the GMA.[58] Universities and other academic institutions are repositories of scientific information. Several Indian tribes have scientists developing information, especially as to fish and wildlife issues. Consultants may be hired. All of these

58. Documents with relevant scientific information available from state agencies in Washington are far too numerous to list here. Following is a small sampling of available documents relating to critical areas designation and protection:

Regarding critical aquifer recharge areas: WASHINGTON DEPARTMENT OF ECOLOGY (WDOE), GUIDANCE DOCUMENT FOR THE ESTABLISHMENT OF CRITICAL AQUIFER RECHARGE AREA ORDINANCES (Publication No. 97-30, 1998); WASHINGTON DEPARTMENT OF HEALTH, WELLHEAD PROTECTION AREAS AS A TYPE OF CRITICAL AQUIFER RECHARGE AREA (Publication No. 331-020, 1992).

Regarding wetlands: WDOE, HOW ECOLOGY REGULATES WETLANDS (Publication No. 97-112 1998); WDOE, WASHINGTON STATE WETLANDS IDENTIFICATION AND DELINEATION MANUAL (Publication No. 96-94, 1997); WDOE, COORDINATING WETLANDS REQUIREMENTS UNDER THE SHORELINE MANAGEMENT ACT & GROWTH MANAGEMENT ACT (Publication No. 94-180, 1994); WDOE, WETLAND BUFFERS: USE AND EFFECTIVENESS (Publication No. 92-10, 1992); WDOE, WETLAND BUFFERS: AN ANNOTATED BIBLIOGRAPHY (Publication No. 92-11, 1992); WASHINGTON DEPARTMENT OF WILDLIFE (WDW), BUFFER NEEDS OF WETLAND WILDLIFE (1992); WDOE, DESIGNING WETLAND PRESERVATION PROGRAMS FOR LOCAL GOVERNMENTS: A GUIDE TO NON-REGULATORY PROTECTION (Publication No. 92-18, 1992); WDOE, DESIGNING WETLAND PRESERVATION PROGRAMS FOR LOCAL GOVERNMENTS: A SUMMARY (Publication No. 92-19, 1992).

Regarding fish and wildlife conservation habitat areas: WASHINGTON DEPARTMENT OF FISH AND WILDLIFE (WDFW), MANAGEMENT RECOMMENDATIONS FOR WASHINGTON'S PRIORITY HABITATS: OREGON WHITE OAK WOODLANDS (1998); WDFW, MANAGEMENT RECOMMENDATIONS FOR WASHINGTON'S PRIORITY HABITATS: RIPARIAN (1997); WDFW, MANAGEMENT RECOMMENDATIONS FOR WASHINGTON'S PRIORITY SPECIES, VOLUME III: AMPHIBIANS AND REPTILES (1997); WDW, MANAGEMENT RECOMMENDATIONS FOR WASHINGTON'S PRIORITY HABITATS AND SPECIES (1991). The Washington Department of Fish and Wildlife also assembles and publishes scientific information on priority species.

Regarding frequently flooded areas: WDOE, COMPREHENSIVE PLANNING FOR FLOOD HAZARD MANAGEMENT (Publication No. 91-44, 1991). *See also* FEDERAL EMERGENCY MANAGEMENT AGENCY, MANAGING FLOODPLAIN DEVELOPMENT IN APPROXIMATE ZONE A AREAS: A GUIDE FOR OBTAINING AND DEVELOPING BASE (100-YEAR) FLOOD ELEVATIONS (FEMA 265, 1995).

Regarding geologically hazardous areas: WASHINGTON DEPARTMENT OF NATURAL RESOURCES (WDNR), LANDSLIDES OF THE PUGET LOWLAND—A SELECTED BIBLIOGRAPHY (Publication No. OFR 98-3, 1998); WDNR, SEISMIC HAZARDS OF WESTERN WASHINGTON AND SELECTED ADJACENT AREAS—BIBLIOGRAPHY AND INDEX, 1988–1991 (Publication No. 92-2, 1992); WDNR, WASHINGTON STATE EARTHQUAKE HAZARDS (Publication No. IC-85, 1988); WDNR, LANDSLIDES OF WESTERN WASHINGTON—A PRELIMINARY BIBLIOGRAPHY AND INDEX (Publication No. OFR 88-1, 1988); WDNR, SEISMIC HAZARDS OF WESTERN WASHINGTON AND SELECTED ADJACENT AREAS—BIBLIOGRAPHY AND INDEX, 1855-JUNE 1988 (1988); WDNR, PRELIMINARY FAULT MAP OF WASHINGTON (Publication No. 80-2, 1980). The Washington Department of Natural Resources also has produced numerous documents on local geological hazards and has assembled geological bibliographies for 30 of Washington's 39 counties (Benton, Chelan, Clallam, Clark, Cowlitz, Douglas, Franklin, Grant, Grays Harbor, Island, Jefferson, King, Kitsap, Kittitas, Klickitat, Lewis, Mason, Okanogan, Pacific, Pierce, San Juan, Skagit, Snohomish, Spokane, Thurston, Wahkiakum, Walla Walla, Whatcom, Whitman, Yakima).

sources of scientific information should be explored by local governments.

Local governments should encourage citizens and other interested parties to provide relevant scientific information during the development of critical areas policies and workshops. Similarly, if a local government has adopted a process for ongoing development of best available science in the context of reviewing project proposals, the local government should encourage both project proponents and opponents to provide relevant scientific information to assist the local government's decision-making.

2. How Does a Local Government Determine Which of the Scientific Information Assembled Is the "Best Available" Science?

Not all information characterized as "scientific" has the same reliability and applicability. Thus, assessing reliability and applicability is a central aspect of determining which scientific information is the "best available." For example, just because a state agency has produced a document relating to wetland delineation does not mean the document constitutes scientific information or should be considered best available science. The technical team contemplated that all purported scientific information, whether documentary or received as testimony, should be assessed using the criteria set forth above.[59] An example of how this assessment might be applied may be useful.

In December 1997, the Washington Department of Fish and Wildlife (WDFW) published a document entitled *Management Recommendations for Washington's Priority Habitats: Riparian*,[60] one in a series of detailed documents intended to identify the habitat needs of fish and wildlife based on the best available science and to provide guidelines for their incorporation in management decisions. This document can be categorized as a *synthesis*, that is, a comprehensive review and presentation of pertinent literature and other relevant ambient knowledge by qualified scientific experts. The synthesis may include recommendations for management or further research derived from the review.[61] According to the assessment criteria drafted by DCTED's technical team, to be considered valid and reliable, a synthesis generally should exhibit peer review, reliable methodology, logical conclusions and reasonable inferences, a defined context, and adequate references.[62]

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59. *See supra* Part II.A.2.
60. Cited *supra* note 58.
61. *See supra* Part II.A.2.
62. *See id.*

Peer review.[63] The WDFW document was critically reviewed by other experts in riparian biology and fish and wildlife biology, as well as others with related expertise. In 1996, WDFW provided a full draft of the document to a 49-member technical review committee; to 51 individuals with riparian expertise employed by federal, state, or county agencies; to all 39 county planning offices in Washington; to 124 city planning offices in Washington; to all Indian Tribes in Washington; and to several universities, private consulting companies, and timber companies.[64] The criticisms of the peer reviewers were addressed by WDFW, as is evident from a side-by-side comparison of the final document with the draft that was distributed in 1996.

Methods.[65] Because the WDFW document is a synthesis, rather than a research study, the appropriate methodology is quite simple: assemble the research studies and other scientific studies that address the issues of interest, evaluate them for their merit and reliability, review them with an eye toward logical patterns and trends in their results and conclusions, and prepare a summary and analysis logically derived from those patterns and trends. If desired, the synthesis can also involve developing and presenting management recommendations, recommendations for further research, or both. WDFW reviewed almost 1,500 scientific studies and reports and prepared its summary, analysis, and management recommendations based directly on that scientific literature. The authors of the WDFW document were careful to note which scientific studies and reports were relied upon at each step of their analysis and recommendations.

Logical conclusions and reasonable inferences.[66] Every conclusion was documented by reference to cited scientific studies. The studies cited in the WDFW document were primarily the products of academic research and government research. The majority of the studies cited were published in peer-reviewed scientific journals, and most of the rest of the studies were published by state or federal agencies with analogous procedures to ensure peer review. Based both on the sheer number of scientific studies reviewed in the WDFW document and on the nature of the review that preceded their publication, the WDFW appears to have assembled virtually all of the pertinent scientific literature published to date, and has derived conclusions and recommendations based expressly on an analysis of those studies. The authors of the WDFW document derived their conclusions and rec-

63. *See id.*

64. Letter of Transmittal from Larry Peck, Deputy Director, Washington Department of Fish and Wildlife, dated July 7, 1998.

65. *See supra* Part II.A.2.

66. *See id.*

ommendations explicitly and transparently from the cited scientific studies. When there were inconsistencies among the cited studies, the authors acknowledged them and explained their reasons for giving more weight to some studies than others.

Adequate references.[67] As noted above, the authors of the WDFW document reviewed and evaluated nearly 1,500 scientific studies dealing with riparian habitats. Every conclusion and recommendation was documented by reference to one or more of the cited studies.

As this brief assessment shows, the WDFW document satisfies the criteria recommended by DCTED's technical team. It clearly should be considered reliable and valid scientific information and, because its analysis and recommendations are tailored explicitly for riparian habitats in Washington, the document must be considered particularly pertinent to the designation and protection of fish and wildlife habitat conservation areas in this state that include riparian habitats. Finally, this document's availability is not an issue. It is available upon request from WDFW,[68] and it certainly should be included as part of the best available science in the record of any local government that is now in the process of developing critical areas policies or regulations to designate and protect fish and wildlife habitat conservation areas under the GMA.

III. WHAT DOES IT MEAN TO INCLUDE BEST AVAILABLE SCIENCE?

Having assembled the "best available" science, what next? What does RCW 36.70A.172(1) require of local jurisdictions by mandating that they "include" best available science in the designation and protection of critical areas?

The Final Legislative Report on this amendment characterized the effect of RCW 36.70A.172(1) as requiring counties and cities to *use* best available science in designating and protecting critical areas.[69] If this singular word choice is significant, the Legislature intended more than a mere procedural requirement—local governments are to substantively rely on best available science when adopting critical areas ordinances. While the Legislature could have used words that would have more clearly indicated an intention that the designation and protection of critical areas be substantively based on best available

67. *See id.*

68. The document also is available on the Internet at <http://www.wa.gov/wdfw/hab/phsrecs.htm>.

69. Final Legislative Report, 54th Leg. 120 (Wash. 1995).

science,[70] the Legislature clearly did not merely require that local governments "consider" best available science, a common type of requirement in the GMA.[71] RCW 36.70A.172(1) requires that best available science be "included" in the development of policies and regulations to protect the functions and values of critical areas, and the challenge is to give meaning to that requirement.

A. Growth Management Hearings Boards' Interpretations

The three Growth Management Hearings Boards have not agreed in their interpretation of what it means to "include" best available science under RCW 36.70A.172(1). The Central Puget Sound Growth Management Hearings Board interprets RCW 36.70A.172(1) as imposing a process requirement on local governments, but not a substantive outcome. A local government satisfies this process requirement if the record supporting adoption of a critical areas regulation demonstrates that the local decisionmakers considered the best available science, even if they subsequently rejected it in favor of non-scientific considerations. The other two Boards, in contrast, interpret the provision as imposing a substantive requirement: a local government must adopt a critical areas regulation that relies on the best available science to provide adequate protection for critical areas, or else it must explain on the record its justification for not providing protection based on science.

1. Central Puget Sound Growth Management Hearings Board

a. Honesty in Environmental Analysis and Legislation v. City of Seattle

The Central Board was the first of the three Growth Management Hearings Boards to hear a challenge under RCW 36.70A.172(1). In *Honesty in Environmental Analysis and Legislation (HEAL) v. Seat-*

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70. *Cf., e.g.*, WASH. REV. CODE § 36.70A.020 ("The following goals . . . *shall be used* exclusively for the purpose of guiding . . .") (emphasis added), .110(2) ("*Based upon* the growth management population projection made for the county by the office of financial management, the county and each city within the county shall . . .") (emphasis added), .175 ("Wetlands . . . shall be delineated *in accordance with* . . .") (emphasis added).

71. *Cf., e.g.*, WASH. REV. CODE §§ 36.70A.030(8) ("the following factors shall be *considered* . . .") (emphasis added), .070(5)(a) ("a county may *consider* local circumstances . . .") (emphasis added), .110(2) ("cities and counties may *consider* local circumstances . . .") (emphasis added), .131 ("In its review, the county or city shall *take into consideration* . . .") (emphasis added), .170(2) ("In making the designations required by this section, counties and cities shall *consider* the guidelines established pursuant to RCW § 36.70A.050") (emphasis added), .215(1) ("In developing and implementing the review and evaluation program required by this section, the county and its cities shall *consider* information from . . .") (emphasis added).

tle,[72] the petitioners challenged Seattle's critical areas ordinance, alleging the city had not included "best available" science. Only the first sentence of RCW 36.70A.172(1) was at issue:

> In designating and protecting critical areas under this chapter, counties and cities shall include the best available science in developing policies and development regulations to protect the functions and values of critical areas.

The Central Board considered the first phrase ("In designating and protecting critical areas under this chapter") merely a limit on the applicability of RCW 36.70A.172(1): it applies only prospectively, and only to local government actions involving the designation and protection of critical areas under the GMA.[73] The Board interpreted the remainder of the sentence ("counties and cities shall include the best available science in developing policies and development regulations to protect the functions and values of critical areas") as follows:

> This is actually several phrases that interact to form the heart of section 172. The language in these phrases is drafted so as to *require* counties and cities to "include the best available science in developing policies and development regulations." "Include" is defined as "to have or take in as a part or member." *Webster's II New Riverside University Dictionary* 619 (1988). "Include the best available science in developing policies and development regulations" instructs counties and cities that they must "have" best available science "as a part of" their development of policies and development regulations.
>
> The key portion of the section in dispute in this issue is "in developing." By using this language the Legislature clearly has not mandated any substantive outcome, or *product*, when counties and cities take actions that are subject to the provisions of this section. Rather, the Legislature has required counties and cities to make the best available science a part of their *process* of "developing policies and development regulations to protect the functions and values of critical areas."
>
> Based upon this analysis, the Board interprets the Legislature's intent to be that counties and cities include the best available science in their process of developing critical areas regulations, so that this information can be considered before any legislative

72. CPSGMHB No. 96-3-0012, Final Decision and Order (Aug. 21, 1996). Petitioners also asserted that RCW 36.70A.172(1) imposed a requirement that local governments adopt policies that include best available science; the Board rejected the contention. *Id.* at 2023.

73. *Id.* at 2025.

> action is taken. This requirement is analogous to the environmental analysis required under the State Environmental Policy Act (SEPA). A primary purpose of SEPA is to ensure that environmental information and analysis is considered by state agencies and local governments prior to taking an action. In this way, SEPA functions as a procedural statute that is intended to ensure that governments make better-informed decisions.
>
> Additionally, the SEPA analogy is bolstered by the fact that the government entity faced with taking some action is not limited to basing its decision solely upon the environmental information that has been developed during the review process (SEPA) or during development of critical areas regulations (GMA). Instead, both SEPA and the GMA provide for the consideration of several competing factors. *Cf.* RCW 43.21C.030(2)(b) and RCW 36.70A.020.[74]

The Central Board concluded that RCW 36.70A.172(1) does not require any particular substantive outcome involving best available science, only that best available science be used in the process of developing critical areas regulations.[75] The Board also left it to local governments to determine what information constitutes best available science and which of that information to include in the development of the ordinance.[76] Accordingly, the Board limited its review to whether the city had included the best available science in the development of its critical areas regulation, not whether the regulation was supported by best available science.[77] In other words, the Board concluded that the local government's critical areas ordinance need not reflect best available science, so long as the local government considered best available science in the development of the ordinance.

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74. *Id.* at 2025-26 (emphasis in original; footnote omitted).

75. Relying on Louisiana v. Verity, 853 F.2d 322 (5th Cir. 1988) (interpreting 16 U.S.C. § 1536(a)(2)), the Board concluded it must "give deference to a local government's choice of scientific data." *HEAL*, CPSGMHB No. 96-3-0012, Final Decision and Order, at 2026-27. The Board suggested that its failure to give deference to local government could create a "paradox," in which the local government would be required to enact regulations designating and protecting critical areas, on one hand, but would be unable to enact those regulations if faced with conflicting scientific information of comparable credibility. "When parties present conflicting expert opinions and scientific information which is included in the record that has been developed during the amendment process, the local government must have discretion to rely on the reasonable opinions of its own qualified experts and its own scientific information, even if the Board might be persuaded by contrary views." *Id.* at 2027 n.12 (citation omitted). As indicated below, there is no "paradox," and the Board may give appropriate deference to a local government's interpretation and application of best available science even if RCW 36.70A.172(1) is interpreted as imposing a substantive mandate. *See infra* Part III.B.3.

76. *HEAL*, CPSGMHB No. 96-3-0012, Final Decision and Order, at 2027.

77. *Id.*

HEAL petitioned for review in King County Superior Court, which reversed the Central Board, holding that RCW 36.70A.172(1) "requires inclusion of best available science in a substantive way and utilized to guide decisionmaking."[78] On appeal to the Washington State Court of Appeals, the court rejected the argument that RCW 36.70A.172(1) requires any particular substantive outcome, based on scientific evidence standing alone.[79] However, the court explicitly held that best available science may not be ignored—it must be substantively considered in the process of adopting policies and regulations to protect critical areas:

> Whether scientific evidence is respectable and authoritative, challenged or unchallenged, controlling or of no consequence when balanced against other factors, goals and evidence to be considered, is first in the province of the city or county to decide. Then, if challenged, it is for the Growth Management Hearings Board to review. The Legislature has given great deference to the substantive outcome of that balancing process. We hold that *evidence of the best available science must be included in the record and must be considered substantively in the development of critical areas policies and regulations.*
>
> While the balancing of the many factors and goals could mean the scientific evidence does not play a major role in the final policy in some GMA contexts, it is hard to imagine in the context of critical areas. The policies at issue here deal with critical areas, which are deemed "critical" because they may be more susceptible to damage from development. The nature and extent of this susceptibility is a uniquely scientific inquiry. It is one in which the best available science is essential to an accurate decision about what policies and regulations are necessary to mitigate and will in fact mitigate the environmental effects of new development.[80]

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78. HEAL v. Central Puget Sound Growth Management Hearings Bd., King County Superior Court No. 96-2-24695-6 SEA, Order on Petition for Review, at 2 (June 5, 1997).

79. HEAL v. Central Puget Sound Growth Management Hearings Bd., 979 P.2d 864, 870 (Wash. Ct. App. 1999).

80. *Id.* (emphasis added, footnote omitted). The court added, apparently in dictum, that a local government that fails to incorporate best available science in its critical areas policies and regulations may find itself constitutionally prohibited from imposing conditions or denying a development permit based on those policies and regulations. *Id.* at 871. The court's analysis was based on the "nexus" and "rough proportionality" limits the United States Supreme Court has placed on governmental authority to impose conditions on or deny development permits under the Fifth Amendment's Takings Clause in Nollan v. California Coastal Comm'n, 483 U.S. 825 (1987), and Dolan v. City of Tigard, 512 U.S. 374 (1994).

b. Tulalip Tribes of Washington v. Snohomish County

In *Tulalip Tribes of Washington v. Snohomish County*,[81] the petitioners asked the Central Board to revisit its holding in *HEAL*. The Board declined:

> The legislature directed local governments to "include . . . [best available science] in developing policies and regulations . . ." If the legislature had intended to require a specific outcome, it could have chosen the types of directive verbs it used elsewhere in the GMA. For example, it could have directed local governments to adopt policies and regulations that *consist* of the best available science, or that *use* the best available science or that are *based upon* the best available science. It did none of these. The Board holds that, because RCW 36.70A.172 requires that local governments "include" best available science in the development of policies and regulations, rather than incorporate or base such enactments upon best available science, this section of the GMA requires a process rather than a substantive outcome. The Board therefore will decline the Tulalips' request to revisit *HEAL*.[82]

However, the Board held that the procedural mandate of RCW 36.70A.172(1) must be read together with the substantive mandate in RCW 36.70A.060 to protect critical areas and with the direction in RCW 36.70A.020(8) and (9) to maintain and enhance fisheries and to conserve fish and wildlife habitat.[83] The Board concluded that certain language in RCW 36.70A.172(1)[84] conveyed a legislative intent to protect the functions and values of critical areas and to recognize the interrelatedness of wetlands and fish and wildlife habitat conservation areas, ecosystems important to the preservation and enhancement of anadromous fisheries:

> The Board holds that the Act's requirement to protect critical areas, particularly wetlands and fish and wildlife habitat conservation areas, means that the values and functions of such ecosystems must be maintained. While local governments have the

81. CPSGMHB No. 96-3-0029, Order on Motions (Oct. 2, 1996).

82. *Id.* at 2454 (emphasis in original; boldface omitted).

83. *Id.*, Final Decision and Order, at 2264-67 (Jan. 8, 1997).

84. The Board highlighted the words in RCW 36.70A.172(1) italicized here:

> In designating and protecting critical areas under this chapter, counties and cities shall include the best available science in developing policies and development regulations *to protect the functions and values of critical areas*. In addition, counties and cities shall give *special consideration to conservation or protection* measures necessary to preserve or enhance anadromous *fisheries*.

Id. at 2265 (emphasis added).

> discretion to adopt development regulations that may result in localized impacts upon, or even the loss of, some critical areas, such flexibility must be wielded sparingly and carefully for good cause, and in no case result in a net loss of the value and functions of such ecosystems within a watershed or other functional catchment area.[85]

How can a local government determine whether its regulations in fact maintain the values and function of critical areas and result in no net loss of those functions and values, except by reliance on best available science? It follows logically from the Central Board's holding that critical areas regulations must substantively use best available science to ensure the necessary protection for the functions and values of the critical areas. Nevertheless, relying on *HEAL*, the Board limited its review under RCW 36.70A.172(1) merely to whether the county included best available science during the development of the critical areas ordinance.[86] On that basis, because "the County had the best available science before it when it developed and adopted" the critical areas ordinance, the county by definition "included" it in developing the ordinance.[87]

c. *Lawrence Michael Investments v. Town of Woodway*

Finally, in *Lawrence Michael Investments v. Town of Woodway*,[88] the Central Board addressed a city's protection of environmentally sensitive areas through the use of land use designations in its comprehensive plan, rather than through the adoption of critical areas regulations. The Board criticized Woodway's approach as an "alternative process" that

> evades the *analytical rigor and scientific scrutiny* required by the GMA in RCW 36.70A.050, .170 and .172. Identifying and designating critical areas pursuant to RCW 36.70A.050, .170, and .172 requires local governments to consider the [Minimum Guidelines] established by CTED (RCW 36.70A.050, .170), and to "include the best available science in developing policies and development regulations to protect the functions and values of critical areas." (RCW 36.70A.172.) The results achieved through the application of these GMA requirements provide the *scientific foundation* to bolster and support performance stan-

85. *Id.* at 2267 (boldface omitted).
86. *Id.* at 2269.
87. *Id.* at 2270.
88. CPSGMHB No. 98-3-0012, Final Decision and Order (Jan. 8, 1999).

> dards and development regulations that protect critical areas as required by RCW 36.70A.060.[89]

Notwithstanding its criticism of the process, the Board found that the City had properly identified and designated wetland and habitat conservation areas.[90] Then, in a move seemingly contrary to *HEAL* and *Tulalip Tribes*, the Central Board *substantively* reviewed the City's proffered scientific support for its designation of the environmentally sensitive area and found it inadequate to support critical areas designations.[91]

2. Western Washington Growth Management Hearings Board

a. Clark County Natural Resources Council v. Clark County

The Western Board first was called upon to interpret and apply RCW 36.70A.172(1) in a challenge to critical areas ordinances in *Clark County National Resources Council v. Clark County*.[92] The Board rejected the Central Board's analysis in *HEAL*, instead interpreting RCW 36.70A.172(1) to impose substantive requirements on local governments:

> The part of subsection (1) that relates to BAS [best available science] can be broken down into the following components:
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> (A) When designating and protecting critical areas under the Act;

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89. *Id.* at 16-17 (emphasis added).

90. *Id.* at 19.

91. *Id.* at 23-26. Apparently, the Board reviewed the city's designation with heightened scrutiny because the city's designated environmentally sensitive area lay within its municipal boundaries and was designated solely in the city's future land use map:

> In reviewing the record, the Board finds that it does not support the proposition that 50.3 acres within the UR designation contain critical areas that are large in scope, of high rank order value and are complex in structure and functions. Also, the Board finds that the record does not support the notion that the 50.3 acres within the UR designation are a critical part of an identified and designated critical ecological system that is large in scope, of high rank order value and is complex in structure and functions. Absent these exceptional environmental attributes, the land use map density designations within the entire 60.8-acre Plan Amendment Area (UR designation) must reflect appropriate urban densities.

Id. at 26. Although the GMA does not allow critical areas designation to be used as a pretext for avoiding other planning requirements of the GMA, the Central Board's declaration that a critical area may be designated within an urban growth area only if the critical area is "large in scope, of high rank order value, and complex in structure and function" appears to be without support in the GMA. The Town of Woodway has appealed. Town of Woodway v. Central Puget Sound Growth Management Hearings Board, Thurston County Superior Court No. 99-2-00081-9 (January 1999).

92. WWGMHB No. 96-2-0017, Final Decision and Order (Dec. 6, 1996).

(B) Local governments *shall* include BAS;

(C) In developing policies and development regulations;

(D) To protect the *functions and values* of critical areas.

Components A (designation and protection) and D (functions and values) are fairly straightforward. The function and values component direction from the Legislature does add more requirements than the sterile designation and protection language found under Sections .170 and .060. Under the function and values component, a local government must go beyond mere designation and protection mechanisms and ensure that the real reason for identification and protection of critical areas (their functions and values) is being accomplished.

The ambiguity contained in subsection (1) relating to BAS comes within the interplay of components B and C. The County cited the recent case of *HEAL v. Seattle* in support of its argument that the emphasis should be on component C (developing), which leads to the conclusion that BAS is essentially a process issue. Petitioners argued that the emphasis in the statute was intended by the Legislature to be on component B (shall include) which leads to the conclusion that in addition to a process issue, a substantive result is required. For the reasons set forth below we agree with petitioners' contention that section .172(1) requires a substantive outcome.[93]

The Board's conclusion that the language of RCW 36.70A.172(1) directs a substantive outcome rested on three lines of analysis: on the admittedly meager legislative history; on a comparison with other directive language in the GMA; and on the fact that section 36.70A.172(2) authorizes the Boards to hire independent scientific experts when adjusting petitions involving critical areas. Unlike the Central Board in *HEAL*, which focused on the reference in RCW 36.70A.172(1) to including best available science in the development of policies and regulations, the Western Board found the requirement that best available science be used to protect the functions and values of critical areas was central to the meaning of RCW 36.70A.172(1). To give effect to that central requirement, the Western Board held RCW 36.70A.172(1) imposes a substantive requirement on local governments to include best available science in their critical areas ordinances.

93. *Id.* at 2208 (emphasis in original).

To determine whether a local government had included best available science, the Western Board held it would examine each case individually, applying three factors: (1) "the scientific evidence contained in the record"; (2) whether the local government's analysis of the "scientific evidence and other factors involved a reasoned process"; and (3) whether the local government's decision was within the parameters of the GMA as directed by the provisions of RCW 36.70A.172(1).[94]

b. Diehl v. Mason County

In *Diehl v. Mason County*,[95] the Western Board rejected a challenge to the County's wetlands buffer protection, implicitly using the analysis set forth in *Clark County Natural Resources Council*. The Board found the buffer widths set by the County to be within the range of scientific recommendations in the record.[96]

c. Friends of Skagit County v. Skagit County

In *Friends of Skagit County v. Skagit County*,[97] the Board explicitly relied on its holding in *Clark County Natural Resources Council* to hold that Skagit County's riparian buffers complied with RCW 36.70A.172(1). Although the county's standard buffer width was at the low end of the range of scientific recommendations, the Board held the buffer width was within the range of best available science in the record and was set through a reasoned process.[98]

However, the Western Board agreed with Skagit Audubon Society that "a preponderance of best available scientific evidence" in the record showed the county had limited designation of fish and wildlife habitat conservation areas in a way that excluded habitat for most priority species occurring in the county:

> We agree with the County that it is not required to adopt [fish and wildlife habitat conservation areas designated in rules adopted by the Washington Department of Fish and Wildlife], but the [County's] definition excludes from designation and protection as [fish and wildlife habitat conservation areas], important habitats as determined by best available science (BAS) provided in this record. Further, the County gives no detailed,

94. *Id.* at 2208-09.

95. WWGMHB No. 95-2-0073, Order Finding Continued Non-Compliance and Rescinding Invalidity (Sept. 18, 1997).

96. *Id.* at 2688.

97. WWGMHB No. 96-2-0025, Final Decision and Order (Jan. 3, 1997).

98. *Id.* at 2249-50.

> reasoned analysis for failing to do so. The only reason we could find in the record was insufficient time.[99]

For this and other reasons, the Board remanded the county's critical areas ordinance in its entirety.[100]

When critical areas issues again reached the Western Board, in a compliance hearing,[101] Skagit County vigorously argued that RCW 36.70A.172(1) requires it to run science-based recommendations through numerous other filters when drafting regulations to protect critical areas. The Board did not specifically address Skagit County's argument, but the arguments of the county and the petitioners clearly outline the terms of the debate.

The petitioners challenged the county's exemption from critical areas regulations for existing and ongoing agricultural operations or agricultural lands, arguing the exemption violated the requirement in RCW 36.70A.172(1) that counties use best available science to designate and protect critical areas. The county responded:

> Although Petitioners criticize the County for not using best available science (BAS), the County has used it consistent with GMA. BAS cannot and should not be considered in the abstract; it must be based in the realities of other relevant factors. The science which the County is using is the science that considers all aspects of the CAs [critical areas] and the resource areas that need to be protected; the science that recognizes that BMPs [best management practices] must be tailored to site-specific circumstances and cannot be applied across the board; the science that recognizes that applying BMPs voluntarily through agricultural resource agencies is working; the science that recognizes that providing incentives to impose BMPs is more effective than imposing them as regulations; the science that recognizes that there are complex issues involved in the WSP [State of Washington Wild Salmonid Policy] process that involves the input from stakeholders before regulations are imposed; the science that recognizes the practical difficulty of repairing and maintaining dikes that have extensive trees and vegetation on them; and the science that refuses to shut down barely economically profitable agricultural operations with excessive buffer requirements.[102]

The Swinomish Tribe, one of the petitioners, responded to the county's argument as follows:

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99. *Id.* at 2249 (brackets added).

100. *Id.* at 2254.

101. *Id.*, Compliance Hearing Order (Sept. 16, 1998).

102. *Id.* at 3047.

> Rather than provide reasoned analysis of a range of alternatives, the County begins with the unsupported dogmatic assumption that any additional limitations on agricultural activities will threaten the economic viability of agricultural activities and then fashions an administrative record to protect and defend that assumption. The County's general approach has been to prioritize the "economic needs" of the agribusiness stakeholders over the "costs" of designating and protecting Critical Areas. This approach does not meet the requirement of "reasoned analysis" mandated by the GMA and this Board's FDO [Final Decision and Order]. . . .
>
> The County cites *Clark County*, supra, for the proposition that it can rely on "other factors" and select alternatives that are not within the range of BAS, but the County reads too much into this case. BAS provides a range of alternatives available that a county may consider. "Local (County) discretion" is permitted to consider "local diversity" on a case-by-case basis. Local diversity has an impact in determining what is "best science," not whether or not BAS should be applied.[103]

Although the Western Board did not resolve the debate in *Friends of Skagit County*, the Board has been explicit in holding that critical areas regulations must substantively include best available science to ensure the required protection for the functions and values of critical areas. Best available science is to be used both to develop critical areas regulations and also to evaluate their effectiveness in providing the protection required under the GMA.

3. Eastern Washington Growth Management Hearings Board

a. Woodmansee v. Ferry County

RCW 36.70A.172(1) was first considered by the Eastern Board in *Woodmansee v. Ferry County*.[104] Woodmansee argued the county had not used best available science in adopting comprehensive plan policies to protect critical areas.[105] The Board agreed, but held RCW 36.70A.172(1) did not apply retroactively to the challenged policies.[106] Nevertheless, the Board warned the county it was henceforth subject to RCW 36.70A.172(1), and signaled its interpretation of the statute

103. *Id.* at 3051.
104. EWGMHB No. 95-1-0010, Final Decision and Order (May 13, 1996).
105. *See id.* at 2069.
106. *See id.*

as requiring the "utilization" of best available science, not merely its consideration.[107]

In a later case involving the same petitioners, the Eastern Board found Ferry County's critical areas ordinance in continued noncompliance with the GMA because the county still had not substantively included best available science.[108] The Board did not address the county's argument that best available science must be balanced with other goals of the GMA, specifically private property rights and economic development goals.[109]

b. *Easy v. Spokane County*

In *Easy v. Spokane County*,[110] two petitioners alleged the county had not included the best available science in designating and protecting wetlands and fish and wildlife habitat conservation areas. The Eastern Board considered and rejected the Central Board's interpretation of RCW 36.70A.172(1) in *HEAL* in favor of the Western Board's interpretation in *Clark County Natural Resources Council*.[111]

On remand, the Board directed Spokane County to develop a process for determining what is best available science and a procedure to utilize it as it is developed.[112] The county subsequently adopted a policy, which the Eastern Board rejected because it left too much discretion to local officials to dismiss best available science.[113] The Board found compliance after the county deleted the offending passage.[114]

c. *Moore v. Whitman County*

In *Moore v. Whitman County*,[115] the petitioner argued the county had not included "best available" science in designating critical aquifer recharge areas. The Eastern Board disagreed, finding the county had appropriately "utilized" best available science because the county had established a meaningful process, developed with significant input

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107. *Id.* at 2069-70.

108. Concerned Friends of Ferry County v. Ferry County, EWGMHB No. 97-1-0018, Final Decision and Order, at 2989-90 (July 31, 1998).

109. *See id.* at 2990.

110. EWGMHB No. 96-1-0016, Final Decision and Order, at 2380 (Apr. 10, 1997).

111. *Id.* at 2380-82.

112. *Id.* at 2384.

113. Easy v. Spokane County, EWGMHB No. 96-1-0016, Order of Compliance, at 2805 (Apr. 10, 1998).

114. *Id.*

115. EWGMHB No. 96-1-0005, Order on Compliance (May 23, 1997). The Board's order was reversed on other grounds in Moore v. Whitman County, Thurston County Superior Court No. 97-2-01404-0. The matter currently is before the Washington Court of Appeals (No. 24542-8-II), and the meaning of RCW 36.70.172(1) remains as an issue.

from qualified scientists, for obtaining best available science as needed to determine whether a particular area should be designated and protected as a critical aquifer recharge area.[116]

In contrast to the Central Board's conclusion that RCW 36.70A.172(1) creates a procedural obligation on local governments, the Eastern Board and the Western Board agree that RCW 36.70A.172(1) imposes a requirement on local governments that they substantively include best available science when developing protective regulations for critical areas. So long as a local government has established a meaningful process that ensures best available science will be substantively included in the ultimate land use planning decision, the Eastern Board has shown a bit more flexibility in allowing best available science to be developed over time.

B. The Technical Team's Interpretation

DCTED's technical team had relatively little trouble defining "best available science" and recommending criteria for local governments to use in assembling and evaluating putative scientific information to determine which of it constitutes best available science. The team had more difficulty in interpreting the requirement in RCW 36.70A.172(1) to "include best available science in developing policies and regulations to protect the functions and values of critical areas."

The technical team ultimately envisioned the requirement to include best available science as a two-stage process. In the first stage, management and land use recommendations are to be developed based on best available science. In the second stage, these science-based recommendations are to be included in the development of policies and regulations to protect critical areas.

1. Developing Management and Land Use Recommendations Based on "Best Available Science"

The technical team concluded that training and experience in a pertinent scientific discipline generally is required to apply the assembled best available science to the critical areas concerns at issue and to develop scientifically valid and reliable management and land use recommendations to address those concerns. The recommendations should be based solely on best available science and framed as a range of scientifically justifiable options or performance standards (*e.g.*, buffer widths, appropriate and inappropriate types of land use, frequencies of monitoring required, etc.). Each option would include an

116. *Id.*

analysis of the associated risks to the functions and values of the critical areas at issue. The objective is to provide decisionmakers with science-based assessments of their options for ensuring protection for critical areas required under the GMA.

The use of a qualified scientist is particularly important where relevant scientific information is absent, sparse, or inconclusive. In this circumstance, the scientist's professional judgment and experience is critical in determining whether there is enough information to develop valid and reliable science-based recommendations, or whether additional scientific studies must be done before there can be any such recommendation.

2. Including Science-Based Recommendations in the Development of Policies and Regulations to Protect the Functions and Values of Critical Areas

The technical team was persuaded by the Western Washington Growth Management Hearings Board's interpretation of RCW 36.70A.172(1), rather than that of the Central Puget Sound Growth Management Hearings Board.[117] The technical team reasoned that the GMA's emphasis[118] on protecting the functions and values of critical areas could only be satisfied if (1) those functions and values are known and described, (2) the likely adverse impacts on those functions and values associated with proposed land use planning alternatives are identified and understood, and (3) land use decisions are made that minimize or eliminate those adverse impacts to the extent possible. In the technical team's assessment, the identification and description of the functions and values of critical areas are scientific endeavors, as are predicting the adverse impacts of alternative land uses and evaluating options offered to minimize or eliminate adverse impacts. The technical team thus interpreted RCW 36.70A.172(1) as requiring the substantive inclusion of best available science in the development of critical areas policies and regulations. Local governments must demonstrate, in the record, how they included best available science in their decisionmaking.

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117. *See supra* Part III.A.1 (Central Board) and Part III.A.2 (Western Board).

118. The GMA's emphasis on protecting critical areas is found in the requirements for early and continuous protection of critical areas in RCW 36.70A.060 and 36.70A.170, and in goals nine and ten of the GMA, found at RCW 36.70A.020(9) (conserve fish and wildlife habitat) and 36.70A.020(10) (protect the environment). This emphasis is recognized and amplified in DCTED's "Minimum Guidelines," in chapter 365-190 of the Washington Administrative Code, and "Procedural Criteria," in chapter 365-195. *See* WASH. ADMIN. CODE §§ 365-190-020, -040, -080; §§ 365-195-410, -825(2) (1999).

The technical team identified five steps local governments could use to ensure that they include best available science, acknowledging that these steps also could be used by a Growth Management Hearings Board or a reviewing court as a means to determine whether a local government in fact "included" best available science:

(1) Identify the scientific information used and the sources of that information.

(2) Identify what that scientific information says and summarize its implications or directions for protecting the critical areas at issue.

(3) Identify the policies and regulations to be taken to protect the critical areas at issue, and explain how closely those policies and regulations reflect the scientific information used. Also explain how closely those policies and regulations reflect the scientific management and land use recommendations developed in the previous stage of the inclusion process.

(4) Identify other information that entered into the decision making. In particular, if the local government relied on other information as a basis for departing from management and land use recommendations based on best available science, explain how the other information supports the decision to depart from the science-based recommendations.

(5) Explain the risks and benefits associated with the policies and regulations adopted, and describe any mitigation necessary to address those risks.

3. Criticisms and Resolution

DCTED received numerous criticisms of the technical team's two-stage interpretation of the inclusion requirement in RCW 36.70A.172(1). There was concern that the technical team, by making science the standard by which critical areas protection must be judged, failed to recognize the competing interests and mandates that local governments must balance under tight budget and personnel constraints. There also was concern that the technical team's recommendations for identifying and assessing best available science would effectively convert the science and science-based recommendations of state or federal agencies into de facto standards from which a local government could depart only by hiring scientists to develop alterna-

tive best available science. Critics also suggested that the five steps recommended as guides for inclusion of best available science will be interpreted as legal requirements, and that violations will be considered noncompliance with RCW 36.70A.172(1).

These concerns reiterate the continuing debate as to whether the inclusion of best available science is a procedural requirement or a substantive requirement. As set forth above, two of the three Boards have held that RCW 36.70A.172(1) imposes a substantive requirement, and the technical team agreed.[119] Significantly, the technical team's interpretation of RCW 36.70A.172(1) is consistent with the only reported appellate decision in Washington interpreting that provision, even though the decision was not issued until well after the technical team submitted its recommendations. In *Honesty in Environmental Legislation v. Central Puget Sound Growth Management Hearings Board*, Division I of the Washington Court of Appeals explicitly held that evidence of the best available science must be included in the record and must be considered substantively in the development of critical areas policies and regulations.[120] The technical team followed the prevailing interpretation of RCW 36.70A.172(1) and considered the statute to impose a substantive requirement that best available science must be included in the development of policies and regulations to protect critical areas.

Moreover, the Legislature in RCW 36.70A.172(1), not the technical team in its recommendations, listed science as the only factor that must be specifically included by local governments in developing critical areas policies and regulations, thereby elevating science to a more prominent position among the factors to be reviewed by local governments. While nothing in RCW 36.70A.172(1) prevents local governments from including other factors in their development of critical areas policies and regulations, they may not ignore best available science in favor of those other factors. Under RCW 36.70A.172(1), local governments must do more than simply include best available science in the record—they must include it in the decisionmaking process.

The technical team designed a process that, if followed, would ensure that decisionmakers were informed as to the implications and significance of the best available science for the critical areas at issue. The technical team's working assumption, which appears to also have been that of the Legislature in adopting RCW 36.70A.172(1), is that there can be no intelligent weighing of the various factors considered

119. *See supra* text accompanying notes 93-94, 111.

120. 979 P.2d 864, 870 (Wash. Ct. App. 1999). *See supra* text accompanying note 80.

when developing policies and regulations to protect wetlands in the absence of valid and reliable scientific information. Without valid and reliable scientific information as to the consequences for protection of the affected critical areas, there can be no understanding of the risks associated with alternative policies and regulations. Without an understanding of the consequences their decisions may have on the functions and values of critical areas, local decisionmakers cannot determine whether their land use policies result in real, cost-effective protection of critical areas.

Certainly, instances exist where the available scientific information is not conclusive because there is either insufficient information to resolve the critical areas issues at hand, the available information is of uncertain relevance or predictive value regarding the critical areas at issue, or the available scientific information is conflicting. A local government is not relieved of its responsibility under RCW 36.70A.060 and .170 to adopt regulations to designate and protect critical areas. Where the available scientific information is either insufficient, possibly inapplicable, or conflicting, the local government has an obligation under RCW 36.70A.172(1) to determine which of the available scientific information is the most reliable, and to make its decisions substantively including that information. Arguably, the less certain the available science, the greater the discretion a local government has in how it responds to the available science.

Of course, local discretion is bounded by the statutory requirement to designate *and protect* critical areas. If the risks to critical areas associated with proposed critical areas regulations are unknown or uncertain, uncertainty exists as to whether proposed regulations provide the protection for critical areas required under the GMA. Arguably, therefore, the less perfect the scientific information available, the more protective the policies and regulations adopted to protect critical areas should be.

Some of the concerns expressed by the technical team's critics reflect a mistrust of the recommendations of state and federal agencies. Perhaps the critics believe those recommendations are not based on best available science. If so, the technical team provided an assessment tool for making that determination and for evaluating any additional scientific information a local government may assemble. Perhaps the critics believe the state's and federal agencies' recommendations are too stringent for the "real world" of local politics and budgets. If so, the technical team provided guidelines to assist the local government in explaining its reasons for departing from those recommendations. If a Growth Management Hearings Board or a

reviewing court finds the local government's explanation unsatisfactory in light of the requirement in RCW 36.70A.172(1), the statutory obligation is at issue, not the technical team's recommendations. Perhaps the critics' primary concern is that it simply costs too much to locate, evaluate, and apply best available science to protect critical areas. If so, the critics should appreciate the wealth of scientific information already assembled and evaluated by state and federal agencies[121] (and others), rather than disparaging it, because the availability of that information frees local governments to weigh the scientific recommendations and risk analyses against their alternatives for action.

Historically, scientific recommendations for protecting environmentally sensitive areas have routinely been run through a series of filters:[122] (1) scientists recommend a standard for protection based on their research and accumulated understanding of the structure and function of the sensitive area; (2) the scientific recommendation is run through a technological filter and the scientific standard is converted into a "technically feasible" standard; (3) the technically feasible standard is run through an economic filter, creating an "economically bearable" standard; and (4) the economically bearable standard is run through the filter of political will, resulting in a "politically enforceable" standard. In this screening process, the standard finally adopted as a land use regulation typically bears little resemblance to the original science-based standard the regulation often pretends to be.

By adopting RCW 36.70A.172, the Legislature apparently sought to short-circuit this filtering process. While science is not the sole criterion to be used in developing critical areas policies and regulations, science has been singled out for special mention. Science must be included in the development of critical areas policies and regulations. The articulated purpose of including science is "to protect the functions and values of critical areas."[123] The Legislature appears to have recognized that science plays a central role in (1) delineating the functions of critical areas and determining their value, (2) recommending strategies to protect their functions and values, and (3) identifying the risks associated with alternative approaches to their protection. Therefore, science-based recommendations can no longer simply be disregarded in favor of competing considerations. Informed decisionmaking requires that decisionmakers receive scientific infor-

121. *See supra* note 58.

122. *See, e.g., supra* text accompanying note 102 (Skagit County's argument in Friends of Skagit County v. Skagit County, WWGMHB No. 96-2-0025).

123. WASH. REV. CODE § 36.70A.172(1).

mation that has not been filtered through screens of competing interests.

IV. WHAT DOES IT MEAN TO GIVE SPECIAL CONSIDERATION TO THE CONSERVATION OF ANADROMOUS FISHERIES?

The second sentence in RCW 36.70A.172(1) requires that local governments "shall give special consideration to conservation or protection measures necessary to preserve or enhance anadromous fisheries." This requirement may be no more than a legislative declaration that the "preservation or enhancement of anadromous fisheries" is an important topic that must be addressed using the best available scientific information. If the focus of this provision is to specify a particular topic of concern, the role of science is to determine both which actions are necessary for preservation and enhancement and which actions would create unacceptable risks to anadromous fisheries. This apparently has been the interpretation of both the Western Washington Growth Management Hearings Board[124] and the Central Puget Sound Growth Management Hearings Board.[125] DCTED's technical team also interpreted the second sentence of section 36.70A.172(1) in this way, outlining a list of factors to guide local governments in giving special consideration regarding anadromous fisheries. This outline is substantively identical to the list of factors provided to guide the inclusion of best available science.[126]

However, a second way to interpret this requirement, which is not mutually exclusive with the first, is as a requirement to use science specially to account for the uncertainty inherent in our imperfect understanding of complex natural systems. The complex natural systems in this case are the natural systems that support and sustain the state's anadromous fisheries. This interpretation is consistent with the role of science articulated in Governor Locke's *Draft Statewide Strategy to Recover Salmon*:

> Incorporating science into the complex natural resource policy and management decisions required in salmon recovery planning presents enormous challenges. Although agency and other scientists have been conducting research on salmon, steelhead, and trout and their habitats for many years, such work has typically been conducted over periods of relatively short duration and has

124. *See* Clark County Natural Resources Council v. Clark County, WWGMHB No. 96-2-0017, Final Decision and Order, at 2209 (Dec. 6, 1996).

125. *See* Tulalip Tribes of Washington v. Snohomish County, CPSGMHB No. 96-3-0029, Final Decision and Order, at 2265-66 (Jan. 8, 1997).

126. *See supra* Part III.B.3.

> not been aimed at comprehensive recovery issues in a long-term context. Moreover, the natural world is extremely complex and dynamic and does not lend itself well to the type of studies performed in laboratories where variables can be controlled and examined one at a time. Attributes of watersheds, the broader ecosystems of which they are a part, and the species that utilize them, change in multiple ways over long time scales (e.g., decades). These time scales are much longer than budget cycles, terms of office, or the professional careers of scientists. Natural systems and human institutions are full of surprises. They often do not respond as we might expect. Uncertainty is the norm.
>
> Given the existing uncertainties about salmon recovery and the need to be as effective and efficient as possible with the natural, human, and fiscal resources available, the goal of science in the Statewide Salmon Recovery Strategy is to use sound scientific concepts, principles, and design approaches [to] guide development, implementation, monitoring, and revision of statewide and regional conservation frameworks and plans. This does not mean that science will adequately answer all questions. It does mean however, that we need to make a deliberate attempt to systematically use science-based information in the development and implementation of the salmon strategy and its related initiatives and plans. The salmon strategy must be scientifically defensible.[127]

Interpreting the "special consideration" requirement in RCW 36.70A.172(1) to require enhanced reliance on science, because of the combination of uncertain knowledge and high risk of extinction, is consistent with a realistic appraisal of the precarious status of salmon and other anadromous fish in Washington,[128] and the importance of

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127. *See* 2 GOVERNOR'S SALMON RECOVERY OFFICE, DRAFT STATEWIDE STRATEGY TO RECOVER SALMON: EXTINCTION IS NOT AN OPTION, at 18-19 (Jan. 1999) (intermediate heading omitted).

128. *See* 64 Fed. Reg. 14,308 (Mar. 24, 1999) (Endangered and Threatened Species; Threatened Status for Three Chinook Salmon Evolutionarily Significant Units (ESUs) in Washington and Oregon, and Endangered Status for One Chinook Salmon ESU in Washington, Final Rule); 63 Fed. Reg. 31,647 (June 10, 1998) (Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for the Klamath River and Columbia River Distinct Population Segments of Bull Trout, Final Rule); 63 Fed. Reg. 13,347 (Mar. 19, 1998) (Endangered and Threatened Species; Threatened Status for Two ESUs of Steelhead in Washington, Oregon, and California, Final Rule); 62 Fed. Reg. 43,937 (Aug. 18, 1997) (Endangered and Threatened Species; Listing of Several Evolutionarily Significant Units (ESUs) of West Coast Steelhead, Final Rule); 60 Fed. Reg. Vol. 19,342 (Apr. 17, 1995) (Endangered and Threatened Species; Status of Snake River Spring/Summer Chinook Salmon and Snake River Fall Chinook Salmon, Final Rule); 57 Fed. Reg. 14,653 (Apr. 22, 1992) (Endangered and Threatened Species; Threatened Status for Snake River Spring/Summer Chinook Salmon, Threatened Status for Snake River Fall Chinook Salmon, Final Rule); 56 Fed. Reg. 58,619 (Nov. 20, 1991) Endangered and

using science to identify significant salmonid habitat and devise policies and regulations to protect that habitat.

The requirement in RCW 36.70A.172(1) to "give special consideration to conservation or protection measures necessary to preserve or enhance anadromous fisheries" should be interpreted as a requirement to bring as much scientific information as possible to bear on those critical areas policies and regulations that conserve or protect the habitat of salmon and other anadromous fish. Not only does the provision require a special effort to obtain valid and reliable scientific information about the conservation and protection measures necessary to preserve or enhance anadromous fisheries, it also imposes a heightened duty to develop science-based and scientifically defensible policies and regulations that give the best possible opportunity for the survival and recovery of anadromous fisheries in Washington.

V. CONCLUSION

DCTED convened a technical team of scientists and planners familiar with the interface between science and policy, and charged the team with evaluating the meaning of RCW 36.70A.172(1) and recommending an approach to its interpretation that would be of assistance to local governments if adopted as a rule by DCTED. As of this writing, it appears DCTED will proceed to draft and adopt a rule based generally on the recommendations of the technical team. The resulting rule will result from what may be the first systematic attempt in this country to define "best available science" or an analogous term in a legal context.

RCW 36.70A.172(1) requires that local governments include the best available science in creating policies and development regulations to protect the functions and values of critical areas. Substantive inclusion of best available science provides three important benefits: (1) helping ensure that local governments adopt critical areas policies and regulations that actually protect critical areas; (2) protecting citizens from uninformed and ineffective regulations; and (3) creating a record that can be used to defend a local government's land use regulations from challenges under the GMA. While the contours of a rule interpreting RCW 36.70A.172(1) have not yet been determined, it appears the rule will assist local governments in locating and assembling scientific information, evaluating the assembled scientific information to determine which information is the best available science, and determining what it means to substantively include best available science in

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Threatened Species; Endangered Status for Snake River Sockeye Salmon, Final Rule). RCW 36.70A.172 was enacted against this backdrop of ESA listings and expected listings.

policies and regulations adopted to protect critical areas. Adoption of a rule probably will not be without controversy, but it could prove very significant in the role the GMA plays in the protection of critical areas in Washington.