

TERESA VANDERBURG, PWS

Natural Science Division Director

Teresa has 18 years of experience in natural resource management and scientific analyses. She is the Director of the Natural Science Division, responsible for 15 staff scientists. Teresa is an experienced project manager and has managed environmental permits for several large-scale public infrastructure projects, including the Seattle Public Utilities Tolt Water Supply Pipeline No. 2 in King County, and the North Fork Clover Creek Regional Detention Pond in Pierce County, Washington. She is certified as a Professional Wetland Scientist (PWS) and has reviewed and/or performed hundreds of wetland assessments, delineations, and wetland mitigation projects. Teresa's expertise also includes shoreline master plan updates for Milton, Puyallup, Sumner, Tacoma, Auburn and Federal Way. She has also developed critical area ordinances for Tukwila, Kent, Burien, Kenmore, Gig Harbor and Sumner. Teresa participated in a Local Government Wetland Advisory Team assisting Washington State Department of Ecology in development of management regulations for wetlands statewide. She also serves as a senior advisor to the University of Washington Wetlands Management Certificate program.

Education

M.S., Environmental Science,
Washington State University

B.S., Biology, Eastern
Kentucky University

Registrations/Certifications

Jurisdictional Delineation of
Wetlands in the Pacific
Northwest, National Wetlands
Science Training Cooperative
(1990)

Professional Wetland
Scientist, Society of Wetland
Scientists (1995)

Certified Wetland Biologist,
Pierce County (current)

Affiliations/Activities

Society of Wetland Scientists

Ecological Society of America

Senior Advisor for the UW
Wetland Management
Certificate Program

18 Years of Experience

Relevant Experience

Gig Harbor Critical Areas Ordinance Update, Gig Harbor, Washington.

Teresa assisted City staff in the review and update of the City's CAO based upon the GMA requirement for consideration of "best available science." She prepared a citywide wetland and stream inventory to support the code update adoption process. Teresa recommended code revisions to meet the requirements of "best available science." She assisted city staff with presentations to the Planning Committee and City Council, and provided response to public comment.

City of Federal Way Shoreline Master Program (SMP) Update, Federal Way, Washington.

As project manager, Teresa is assisting the City of Federal Way with an update to its Shoreline Master Program (SMP). Federal Way includes both the marine shoreline of Puget Sound, and portions of 7 freshwater lakes. Teresa has managed the completion of the Draft Shoreline Inventory and Characterization Report, including its on-time delivery to the Washington State Department of Ecology. She has also worked with planners and the City to develop preliminary environment designations and begin review of the goals, policies and shoreline regulations. Public involvement to date has included preparation of a Public Participation Plan, attendance at an Open House, a presentation to the Planning Commission, and participation in two meetings with the Citizens Advisory Committee. Teresa has prepared quarterly progress reports to fulfill the City's state grant requirements.

Tacoma Shoreline Master Program Update - Phase 1, Tacoma, Washington.

Tacoma shorelines include Commencement Bay, marine areas along Hood Canal, the Puyallup River, Hylebos Creek, and Wapato Lake. As the scientific lead, Teresa has assisted City staff in the review of the City's

Relevant Experience (Continued)

recently adopted Critical Areas Preservation Ordinance (CAPO) and the requirements under the new shoreline guidelines for protection of critical areas within the shoreline. The City of Tacoma has been challenged before the Growth Management Hearings Board related to the adequacy of the City's protection of its designated critical marine fish and wildlife habitats. Further, Ecology requires a comprehensive update of the SMP to address critical areas within the shoreline jurisdiction. Teresa provided senior review of the Draft Shoreline Inventory and Characterization Report prepared for the City, and prepared a "gap analysis" of issues related to critical areas protection in the City's shoreline environment.

Pierce County Transportation Services, Environmental On-call, Pierce County, Washington. Teresa is managing on-call contract providing environmental services to Pierce County Transportation since 2001. Her responsibilities include coordinating with Pierce County managers and contract management for various road improvement and bridge replacements projects in Pierce County. Services provided include critical area studies, stream surveys, biological assessments, EIS preparation, and mitigation planning. Environmental permitting and support is also part of these services. Projects have included: Lake Tapps Parkway East, Kapowsin Creek Bridge Replacement, South Prairie Road improvements, Spanaway Loop Road, Foothills Trail, Canyon Northerly Extension, and Muck Creek Road.

Kenmore Critical Areas Ordinance Revisions, Kenmore, Washington. Teresa worked with City staff to develop and tailor a new critical areas ordinance for the City of Kenmore to meet GMA requirements for including the "best available science". She prepared sections for wetlands, streams, fish and wildlife habitat, and geological hazard areas. Teresa worked with City staff to develop an ordinance that facilitates implementation for both City staff and applicants. Part of this work included conducting a city-wide wetland and stream inventory in support of the regulations, and developing specific protection measures for the Kenmore great blue heron rookery using GIS mapping. Teresa presented draft code and scientific information to the City Council, responded to public comment and supported the CAO through adoption.

NorMed Warehouse Commercial Reasonable Use, Tukwila, Washington. Teresa managed environmental permitting and permit negotiation in support of a commercial development for the NorMed-Shaw Partnership in Tukwila, Washington. She prepared wetland mitigation plans and stream relocation plans to satisfy US Army Corps of Engineers Section 404 Individual Permit, Ecology Water Quality Certification, Hydraulic Project Approval, and local permits from Tukwila. Teresa assisted the client in negotiations related to mitigation requirements for a RUE. Currently, Teresa is providing environmental oversight during construction of the 1.1-acre wetland mitigation area and stream relocation.

Relevant Experience (Continued)

City of Kent Critical Areas Ordinance Update, Kent, Washington. Teresa is assisting City of Kent Public Works Department and Planning Department in the review and update of the wetland regulations based upon the GMA requirement for consideration of “best available science.” She prepared a “best available science” report for the City and recommended code revisions to meet the scientific requirement. Teresa assisted city staff with presentations to the Planning and Economic Development Committee and City Council. She also assisted City staff with Wetland Focus Group meetings, and meetings with CTED and Washington Department of Ecology. Teresa conducted an additional analysis of wetlands in the City rated using the new Ecology rating system and the City’s existing rating system.

Sultan Shoreline Master Program Update, Sultan, Washington. Teresa provided senior wetland and ecological expertise in an update to Sultan's shoreline master program using the new Ecology shoreline guidelines. She revised the shoreline inventory and characterization of shoreline conditions along the Sultan, Wallace, and Skykomish Rivers in the City's jurisdiction. The Department of Ecology has posted the City’s Inventory and Map Folio on their website as a model inventory for SMP updates.

Puyallup Shoreline Master Program Update, Puyallup, Washington. As Principal in charge, Teresa provided senior ecological expertise and principal review for an update to Sultan's shoreline master program using the new Ecology shoreline guidelines. The Draft Shoreline Inventory & Characterization report was prepared and submitted to Ecology for review in July 2006. After review of the inventory report, the City plans to review its shoreline program’s goals, policies and regulations.

City of Milton Shoreline Master Program Update, Milton, Washington. As project manager, Teresa prepared a Draft Shoreline Inventory & Characterization report for the City of Milton. This project was state funded and focused on the Hylebos Creek. After review of the inventory report, the City plans to review its shoreline program’s goals, policies and regulations.

Woodinville Sensitive Area Ordinance Update, City of Woodinville Planning Department, Washington. Teresa served as principal in charge for critical areas ordinance update. Providing technical guidance for the critical area inventory, mapping, and Best Available Science (BAS) technical reports addressing wetlands, streams, wildlife, and fish. Teresa assisted the City with draft regulations to protect sensitive areas in the City.

Sound Transit Regional Express Project, Kirkland, Washington. Teresa assisted Sound Transit with permit negotiation at the local and federal levels for impacts to wetlands resulting from construction of the Kirkland HOV direct access, transit center, and park and ride lot improvements. Wetland issues were resolved to facilitate Corps Section 404 permitting and project impacts were

Relevant Experience (Continued)

mitigated. Mitigation alternatives were developed and negotiated with Kirkland to meet federal, state and local regulations.

Casper Reasonable Use Exception, Shoreline, Washington. Teresa served as an expert scientific witness related to wetlands, streams and buffer impacts from a single-family residence proposed under a RUE in Shoreline, Washington. She evaluated impacts, RUE criteria, code requirements and prepared a mitigation plan in support of property owner. Teresa provided testimony at the RUE hearing.

I-405 WSDOT Urban Corridors Project, King County, Washington. Teresa provided principal review and quality control for wetland technical studies, mitigation plan documents, and discipline reports for the Bellevue, Kirkland and Renton Nickel projects on I-405. Teresa also negotiated mitigation requirements with City of Kirkland Planning and Parks staff to develop alternatives resulting in mitigation development at Forbes Lake in the Kirkland.

Tukwila Sensitive Areas Ordinance, Best Available Science (BAS) Review, Tukwila, Washington. Teresa is currently assisting the City of Tukwila with review of the City's critical areas regulations as required under the Growth Management Act (GMA) for use of "best available science" and special consideration for salmonids. Teresa will prepare several white papers that summarize the state of science for wetlands, streams and buffer requirements. The project also includes review and revision to the critical area code language for consistency with BAS. She assisted City planning staff with Planning Commission meetings, public hearings, and City Council workshops.

Burien Critical Areas Ordinance Revisions, Burien, Washington. Teresa assisted with development and adoption of a new critical areas ordinance for the City of Burien. She coordinated with City staff to develop new sections on critical aquifer recharge areas, streams, fish and wildlife habitat, and wetlands. Teresa presented sections to City Planning Commission and City Council in support of code adoption.

Wilkinson Property, Gig Harbor, Washington. Teresa served as an expert scientific witness for the City of Gig Harbor to testify on issues related to wetlands and buffer requirements for condemnation of a property for a City park. As a consultant to the City, Teresa conducted a wetland assessment of the site, assessed wetland functions and values, and determined the local code requirements for protection of onsite wetland resources. Teresa provided expert testimony in a juried trial before Pierce County Superior Court.

City of Kenmore On-Call Environmental Services Contract, Kenmore, Washington. Teresa managed an on-call environmental services contract with the City of Kenmore, Washington. Work involves coordinating and conducting third-party reviews of development proposals for compliance with City's critical areas regulations. Her responsibilities include development review, code

Relevant Experience (Continued)

interpretation and technical review of wetland delineations, stream classifications, and mitigation plans. Teresa has testified before the Hearing Examiner on behalf of the City for SEPA Appeal hearings and Preliminary Plat Hearings.

City of Auburn Wetland and Stream Inventory, Auburn, Washington.

Teresa conducted an inventory of stream and wetland resources on approximately 14,550 acres within the City limits of Auburn, Washington. The 2002 inventory updated information from an earlier wetland inventory conducted in 1990 and 1991. Work included comprehensive field reconnaissance work, wetland descriptions, stream classifications, GIS maps and associated metadata and a summary technical report. Historical permit information from approximately 90 historical permit files was incorporated into the GIS metadata and maps to allow the City to track past permit activities by parcel.

Washington State Office of Community Development (OCD) Model Critical Areas Ordinance.

As part of a multi-disciplinary team, Teresa provided scientific input to the State OCD, now referred to as the Department of Community, Trade and Economic Development (CTED), to develop a model critical areas ordinance for use in the State of Washington. This “model” ordinance was included as example regulations in CTED’s Critical Areas Handbook to local jurisdictions.

Lakewood/Clover Creek Flood Management Project, Washington.

Teresa served as the environmental lead in development and evaluation of flood management alternatives for Clover Creek within the City of Lakewood. Working with the engineer, Teresa evaluated flood control alternatives including construction of high flow bypasses, regional detention facilities, raised creek banks and culvert enlargements designed to alleviate flooding problems upstream of Bridgeport Way. The study included evaluation of the sites for wetlands, streams and fish habitat areas along with development of permitting constraints and strategies for the feasibility study.

SR 522 Roadway Improvement Project, Kenmore, Washington.

Teresa conducted wetlands delineation, prepared US Army Corps of Engineers Section 404 permit application, and authored a discipline report for wetlands, streams and water quality issues. This discipline report was in support of the NEPA Environmental Assessment for the SR 522 Roadway Improvement Project. Teresa coordinated with the project engineers, WSDOT personnel, Corps of Engineers staff, and City staff during the permitting process.

Avondale Road Improvements, King County, Washington.

Teresa managed wetland technical studies, environmental permitting, and mitigation requirements for road improvements proposed by King County Roads Division on Avondale Road and for the intersection of Avondale and Woodinville-Duvall Road. Off-site mitigation areas at the Chin property were delineated and

Relevant Experience (Continued)

evaluated. Teresa developed permit matrix and negotiated permit conditions with the resource agencies as part of mitigation feasibility.

Pierce County Public Works and Utilities, North Fork Clover Creek Regional Stormwater Detention Facility, Pierce County, Washington.

Teresa managed environmental permits for construction of a 12-acre regional stormwater detention facility on Aqueduct Drive East, near Spanaway in Pierce County Washington by Pierce County Public Works and Utilities, Water Programs. She assisted Pierce County with site selection, feasibility analysis, environmental studies, environmental permits and mitigation implementation. Teresa managed the preparation of wetland, stream and wildlife habitat studies, conceptual and final wetland mitigation plans, and permit applications for Pierce County Planning & Land Services, Hydraulic Project Approval, Ecology Section 401 Water Quality Certification, and Corps of Engineers Section 404 permit. The pond facilities includes a diversion structure constructed in a salmonid stream and an outlet structure to release water back to North Fork Clover Creek.

Marysville UGA Wetland and Stream Inventory, Marysville, Washington.

Teresa managed an extensive inventory of wetlands, streams and habitat in an approximately 2,000-acre area in the Lakewood-Smokey Point region of Marysville's Urban Growth Area. This study was funded by a Coastal Zone Management (CZM) grant. The project was undertaken to evaluate lands to be annexed into the city for residential, commercial and industrial development. The study included wetland descriptions and functional evaluations, descriptions of stream habitat, documentation of fish presence or absence, and water quality testing. Other elements of the study included assessment of future build-out conditions within the planning sub-area and evaluating potential mitigation concepts. Prepared a wetland and stream inventory report, including field maps and habitat data, for review and approval by both the City of Marysville and the Washington Department of Ecology. Teresa participated in a public workshop to inform citizens of the future build-out conditions within the Lakewood-Smokey Point area.

Kenmore Gap Analysis, Review of ESA Compliance, Washington. Teresa served as Task Lead for this "gap analysis" for the City of Kenmore to identify potential gaps and deficiencies in City codes, regulations, plans and policies in relation to the Endangered Species Act (ESA). This report will specifically address the local jurisdiction requirements in the Final 4(d) Rule by National Marine Fisheries Services (NMFS) for protecting and avoiding "take" of Puget Sound chinook and other federally-listed fish. Adolfson is reviewing sensitive areas ordinances, the Comprehensive Plan, stormwater regulations and road maintenance standards and practices for ESA compliance. Also part of this work is to review the Tri-County Proposal (King, Snohomish and Pierce Counties) for compliance with the 4(d) rule and discuss the differences between this proposal and Kenmore's current practices and plans. A list of

Relevant Experience (Continued)

recommendations for "next-step" items is currently being developed to guide the City in its response to NMFS regarding salmon protection and recovery.

PG& E Gas Transmission Pipeline Expansion, Idaho, Washington, Oregon.

Teresa managed technical studies for rare plants, wetlands, habitats, noxious weeds and stream crossings for a proposed 250-mile long natural gas transmission line expansion project. The project included expansion of the transmission pipeline right-of-way as well as upgrades to several Main Line Valves and Compressor Stations. The project extended from the Canadian border through Idaho, eastern Washington and eastern Oregon. Managed field biologists tasked with the identification and mapping of rare plants, noxious weeds, wetland boundaries, and streambanks using hand held GPS units. Work products included two resource reports to the Federal Energy Regulatory Commission (FERC).

Mill Creek Flood Control Management, King County Surface Water Management Division, Washington.

Teresa evaluated environmental impacts of flood control within the lower Green River Valley, as part of a hydrologic modeling effort. She analyzed potential impacts and benefits to wetland and riparian habitats with implementation of five proposed flood-control alternatives. Teresa coordinated with the Mill Creek Special Areas Management Plan (SAMP) Committee (represented by the U.S. Army Corps of Engineers, Washington State Department of Ecology, U.S. Environmental Protection Agency, local governments, and King County Surface Water Management) as an integral part of impact evaluation for this project.

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Tributary 087 Sedimentation Control Project, City of Woodinville, Washington.

Teresa served as project manager, and conducted stream and wetland surveys. She also assisted with developing mitigation alternatives to address serious sedimentation problems occurring in the tributary, which flows into the Sammamish River in Woodinville that supports coho salmon. Teresa

Relevant Experience (Continued)

provided agency coordination and met with team members to discuss various ways of minimizing sediment inputs to the stream, which have resulted in the loss of valuable habitat in the lower reaches of the tributary.

Tolt Pipeline No. 2, Phase IV, Seattle Public Utilities, Washington. Teresa managed wetland technical studies, environmental permitting, and construction monitoring for a new 6-mile long, 54-inch diameter water supply pipeline to expand system capacity for Seattle Public Utilities. The project extended from the Lake Forest Park Reservoir east to the City of Woodinville and involved multiple jurisdictions within the corridor. Teresa managed preparation of City of Bothell Shoreline Substantial Development Permit, Bothell Critical Areas Permit, King County Public Agency and Utility Exception (PAUE), and Lake Forest Park critical areas review. Teresa negotiated jurisdictionality of wetlands with Corps of Engineers to support the Corps Section 404 permit, Nationwide 12 process. She prepared a water quality monitoring plan for construction and managed field staff in monitoring daily water quality and turbidity throughout the two-year construction period as part of King County PAUE permit conditions and Ecology Water Quality certification conditions.

Cowlitz River Hydroelectric Project, Lewis County Public Utility District No. 1, Washington. Teresa provided technical assistance in the final design and implementation of large-scale wildlife mitigation plans related to construction of a 70-megawatt hydroelectric project. Mitigation included installation of over 9,200 native shrubs and trees and enhancement seeding of over 100 acres for reservoir shoreline restoration, as required by Federal Energy Regulatory Committee (FERC) licensing.

Magnuson Park Wildlife Habitat Evaluation and Impact Analysis, Audubon Society, Washington. Teresa conducted a wildlife habitat evaluation and assessment of existing natural resources for the Magnuson Park area. She performed a reconnaissance-level investigation of existing habitat areas, including wetlands and shorelines within the park. Teresa documented observations of wildlife and waterfowl use on site and provided habitat mapping for the park. She also prepared an objective evaluation of two developed proposals including the Sand Point Community Liaison Committee proposal prepared by Rich Haag Associates (1994) and the City of Seattle Community Preferred Reuse Plan for Sand Point (1993).

South Hill Drainage Improvement Project, Pierce County Water Programs, Washington. Teresa managed wetland delineations and conceptual mitigation planning for a 1,430-acre drainage basin in Puyallup, Washington. This basin includes sites identified by Pierce County as a potential wetland mitigation banks where increased flood water storage is desired. Teresa evaluated impacts from a new pump station and a drainage pipe system and prepared conceptual mitigation plans.

Relevant Experience (Continued)

On-Call Wetland Biologist Services, Pierce County, Washington. Teresa provided on-call wetland consulting services for Pierce County Storm Drainage and Surface Water Management Utility for several proposed regional storm water retention-detention facilities. She conducted wetland delineations on a 22-acre parcel in the Clear Creek drainage that has been slated for flood storage enhancement and possible wetland mitigation banking. Teresa reviewed engineered designs of a flood water R&D facility along North Fork Clover Creek. She assessed wetland impacts and assisted Pierce County in obtaining federal, state and local permits.

Pritchard Beach Reserve Master Plan, City of Seattle Parks and Recreation, Washington. Teresa served as project manager, and led environmental permit preparation for park development and wetland restoration for this City-owned park on the shoreline of Lake Washington. The Department of Parks and Recreation developed a Master Plan for Pritchard Beach and Adolfson has secured a Nationwide Permit from the U.S. Army Corps of Engineers, an HPA Permit from the Washington Department of Fish and Wildlife and a Shoreline Exemption Permit from the City of Seattle.

Haley Property State Park Master Plan, Washington State Parks and Recreation. Teresa managed and conducted wetland delineations and performed an analysis of wetland functions and values for a 178-acre proposed park on Case Inlet in Pierce County, Washington. The study included palustrine wetlands and intertidal, estuarine wetlands associated with Case Inlet. Teresa evaluated wetland and buffer impacts likely from implementation of the Haley State Park Master Plan and assisted in environmental permitting. In 1996, she conducted additional analyses for State Parks when the man-made dam forming the lagoon was compromised during a local earthquake. Teresa analyzed the potential for wetland restoration following full dam removal. She prepared a wetland mitigation plan for park development which was submitted to Pierce County. Teresa evaluated wetland and buffer impacts likely from implementation of the Haley State Park Master Plan.

Tubal Cain Golf Course, Evergreen Golf Design, Inc., Washington. Teresa assisted with planning and construction of a new golf course west of Dungeness River near Sequim. Teresa performed wetlands reconnaissance and mitigation summary. She performed formal wetland delineation, report, and mitigation plan, and assisted with SEPA checklist and permitting.

Poortinga Property Restoration, Tulalip NRDA Trustees, Washington. Teresa assisted the Tulalip NRDA Trustees with a site feasibility study and conceptual restoration plan for fish and wetland habitat for a 300-acre property in the Snohomish River estuary in Marysville, Washington. The focus of the feasibility study was to provide off-channel fish habitat using the lower Snohomish River Estuary and restore intertidal lands, brackish marsh and palustrine wetlands. Dike removal was preliminarily investigated and the land was purchased by the Trustees, as a result of the study.

Relevant Experience (Continued)

Green Mountain Land Exchange, Washington. Teresa conducted rare and endangered plan surveys over hundreds of acres of road less timberlands near Enumclaw, Washington in support of a large-scale land exchange between the US Forest Service and the Weyerhaeuser Corporation.

Confidential Private Development, Kitsap County, Washington. Adolfson conducted a reconnaissance level evaluation for an approximately 1000-acre site in Kitsap County, Washington for a proposed confidential private facility. Adolfson conducted field investigations related to wetlands, streams, and threatened and endangered species listed under the Endangered Species Act (ESA) as part of a feasibility analysis for the site. Teresa served as the field lead and prepared a letter report outlining environmental issues for the feasibility.

Publications

Vanderburg, T.H. June 2002. Best Available Science and Updating Critical Areas Regulations. Seattle Daily Journal of Commerce, article. Seattle, WA.

Baes, C. III, S. McLaughlin, and **T.A. Hagan (Vanderburg)**. 1984. Multi-elemental Analyses of Tree Rings: Temporal Accumulation Patterns and Relationship with Air Pollution. In Proceedings, Symposium on Air Pollution and the Productivity of the Forest, Sir Isaac Walton League, Arlington, VA. 273-286 pp.

Hagan (Vanderburg), T.A. 1988. Ponderosa Pine Tree Rings: Variability of Response to Precipitation in Space and Time. Washington State University, Master of Science/ Environmental Science Thesis.

Hagan (Vanderburg), T.A., and E.H. Franz. 1991. Variability of Response to Precipitation Along a Moisture Gradients. M.S. research presented at the annual meeting of the Ecological Society of America. August 7th, San Antonio, TX.

Presentations

Vanderburg, T. Critical Areas: Landscape Scale Analysis and Watershed Model. Moderator to Session on November 1, 2005. Washington American Planning Association Conference, Bellevue, WA.

Vanderburg, T. Including Best Available Science – A Scientist’s Perspective. Presentation on April 29, 2005 to the Planning Association of Washington, Spokane, WA.

Vanderburg T.H. and J. Purcell. 1995. Dam Removal Effects on an Estuarine Lagoon, Haley State Park, Pierce County, Washington. Poster presented at

Relevant Experience (Continued)

annual meeting of Society of Ecological Restoration, September 1995, Seattle, WA.

Baumert, Judith A. and **T. Hagan (Vandberburg)**. Wetland Mitigation; How Do We Define No Net Loss?, 191 PESI Wetlands Seminar, May 10, 1991, Seattle, WA.

Skills and Qualifications

- Project Management and Agency Coordination
- Wetland Delineation, Inventory and Mitigation Planning
- Environmental Permitting and ESA compliance
- SEPA and NEPA Documentation
- Extensive experience conducting wetland delineations, impact analyses, and mitigation
- Managed several on-call environmental services contracts with multiple work orders
- Highly experienced in federal, state, and local environmental permitting requirements for developments and public infrastructure projects affecting wetlands, streams, buffers and habitat. This includes state Shorelines, federal Section 404 permits, Section 401 water quality certifications, Hydraulic Project Approvals, ESA compliance and local critical areas permits.
- Extensive knowledge in shoreline master program and local critical areas ordinance development, and “best available science.”
- Provides expert witness and testimony on scientific issues