

## **BETTER BIOLOGICAL ASSESSMENTS FOR TRANSPORTATION PROJECTS: TRAINING AND GUIDELINES FOR AUTHORS**

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### **ABSTRACT**

In today's regulatory environment, efficient and detailed preparation of Endangered Species Act (ESA) Section 7 biological assessments (BAs) is critical to any state or local transportation agency and its project planning. The combination of federally funded or permitted transportation projects and the potential presence of federal-listed animals and plants and designated critical habitats typically results in the preparation of a BA. An incomplete or otherwise inadequate BA can result in project delays and increased costs. The Washington State Department of Transportation (WSDOT) and federal transportation and ESA regulatory agencies have come to agreement on how to conduct certain analyses associated with a BA. Since 2002, WSDOT has provided training, guidelines, and other resources to teach individuals how to complete these approved BA analytical procedures and protocols. The centerpiece of the training is the WSDOT *Biological Assessment Preparation Advanced Training Manual*, which provides a BA outline and specific instructions addressing each section of the BA. WSDOT provides an annual multi-day training course for consultants, and other state and federal agency staff that prepare or review BAs. Individuals are provided detailed training in the preparation of all sections of the BA, including complex transportation project issues associated with action area definitions, terrestrial/aquatic noise, stormwater impact assessments, and species effect determinations. Individuals are tested and those that pass the course are considered "trained and qualified" to prepare BAs for WSDOT. However, the skills acquired can be applied to the preparation of BAs for other transportation agencies and most non-transportation situations. Qualified preparers are required to attend requalification training every two years. WSDOT provides post-training support by posting relevant updates on dedicated internet and intranet sites. The internet site provides a current BA Preparation Advanced Training Manual, and information on recent listing actions, new monitoring requirements, and the emerging issues of noise and its effects on terrestrial and marine species. By standardizing basic BA preparation, authors understand agency expectations and are aware of the specific effects of transportation projects on species listed under the federal ESA. The training increases draft BA quality, facilitating the internal review process. WSDOT has trained BA authors from Washington, Oregon, California, Utah, Idaho, and Montana, and its dedicated internet site continues to provide relevant information for anyone involved in preparing a BA. Using a similar standardized approach and training, other state and local transportation agencies throughout the United States can tailor BA preparation to efficiently address existing and emerging endangered species issues within their jurisdictions.

### **INTRODUCTION**

In today's regulatory environment, efficient and detailed preparation of United States Endangered Species Act (ESA) Section 7 biological assessments (BA) is critical to any state or local transportation agency and

its project planning and implementation. The combination of federally funded or permitted transportation projects and the potential presence of federal-listed animals and plants and critical habitats requires ESA review, frequently resulting in the preparation of a BA. An incomplete or otherwise inadequate BA can result in project delays and increased costs. The Washington State Department of Transportation (WSDOT), Federal Highway Administration (FHWA) and ESA regulatory agencies have agreed on how to conduct certain analyses included in a BA. Since 2002, WSDOT has provided training, guidelines, and other resources to teach individuals how to complete these approved BA analytical procedures and protocols. By standardizing basic BA preparation, authors understand agency expectations and are aware of the specific effects of transportation projects on species listed under the federal ESA. In addition, the training increases draft BA quality, facilitating the internal review process. WSDOT has trained BA authors from Washington, Oregon, California, Idaho, Utah, and Montana, and its dedicated internet site continues to provide relevant information for anyone involved in preparing a BA. Using a similar standardized approach and training, other state and local transportation agencies throughout the United States can tailor BA preparation to efficiently address existing and emerging endangered species issues within their jurisdictions.

### **What is a Biological Assessment?**

Interagency coordination, as defined in Section 7 of the ESA, requires all federal agencies to consult with the USFWS and NMFS if a federal action agency determines that any action it funds, authorizes, or carries out may affect a listed species or designated critical habitat. Section 7 of the ESA applies to all transportation projects that have a federal nexus (i.e., projects which require a U.S. Army Corps of Engineers permit, receive any kind of federal authorization, or is fully or partially funded by the federal government, or occur on federal land).

A BA document is required for any major construction activity. This document analyzes the potential effects of the project on listed species and critical habitat and justifies a particular effect determination for each species and critical habitat addressed. Major construction activity is defined in the ESA Section 7 regulations (50 CFR 402). All federal agencies are responsible for evaluating impacts on listed species resulting from all federal actions, regardless of scope. For listed species and designated critical habitat, this process of evaluation and federal review is termed *consultation*; however, for proposed species or critical habitats, this process is referred to as *conference*.

The major sections of a BA include:

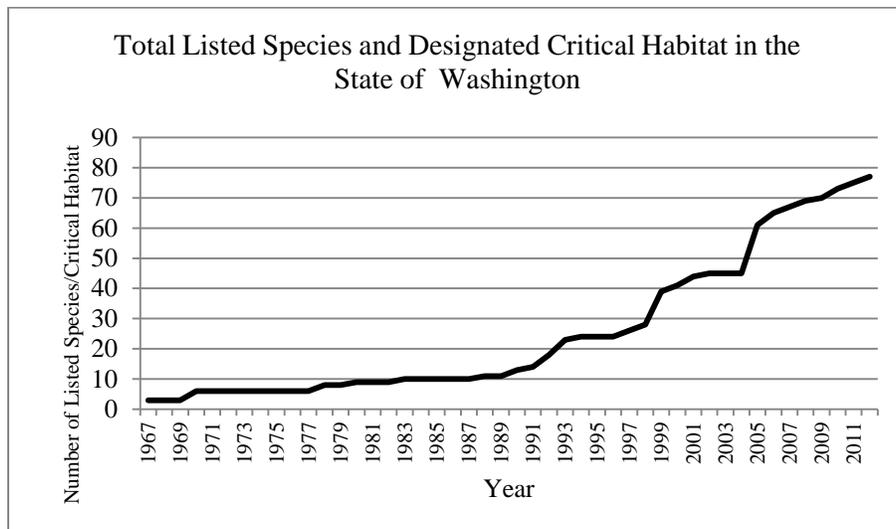
- The project description, including the proposed timing of the work;
- The project action area: (the geographic area that will be affected by proposed project actions);
- Efforts to avoid and minimize impacts;
- Status of species and designated critical habitats in the project action area;
- The effects of project actions on listed species and designated critical habitats in the project action area;
- Effect determinations to listed and proposed species and critical habitats.

FHWA and WSDOT developed a BA outline that includes results of on-site inspections determining the presence of listed or proposed species, and an analysis of the likely effects of the action on the species or habitat based on biological studies, review of the literature, and the views of species experts. In formal consultations, the BA also describes any known unrelated future non-Federal activities (“cumulative effects”) reasonably certain to occur within the action area that are likely to affect the species. The BA addresses all listed and proposed species potentially found in the action area, not just those listed and proposed species that are likely to be affected. One of the purposes of the BA is to help make the

determination of whether the proposed action is “likely to adversely affect” listed species and critical habitat. To make such a determination, all species and critical habitats must be addressed.

### History of WSDOT BA Training and Guidelines

The number of listed terrestrial and aquatic species and critical habitat designations in Washington has increased rapidly since 1990 (Fig. 1). In addition, new understanding of various project effects on fish and other listed species came to light. Subsequently, the BAs became increasingly complex. The life histories of many species span various habitat types over time (especially anadromous fish), requiring BA authors to assess how project activities potentially impact habitat that may be occupied only a small portion of the year during a specific life stage. Transportation projects in Washington, now analyze terrestrial and in-water noise, effects of bank hardening, stormwater, and indirect effects, all new developments since 2002. Biologists must consider various noise metrics and how each species or functional hearing group (pinnipeds, baleen and toothed whales, birds, fish, etc.) may be affected by noise, and where that noise attenuates to background levels.



**FIGURE 1. Total listed species and designated critical habitats in the State of Washington from 1967-2012**

In addition to the increasing number of listed species in the State, WSDOT also had a large number of projects requiring formal and informal consultations that were funded by the 2003 gasoline tax funding package. For example, in 2004 there were more than 120 WSDOT projects requiring formal or informal consultation, with each requiring preparation of a BA. The extent of the increased BA workload required WSDOT to distribute the task of preparation to multiple consulting firms. As a result of increases in the number of federal listed species and designated critical habitat in Washington State, increasing BA complexity, the numbers of BAs being prepared, and the absence of a standardized approach to conducting analyses of complex topics, WSDOT received a high number of substandard BAs from their on-call consultants. BAs may be substandard for many reasons, but they often result in misunderstandings among project team members, project delays, and increased costs. BA training was considered one part of a greater ESA process improvement program to provide reliable delivery of BAs.

Prior to 2002, BA authors had limited opportunities for BA preparation training, and even less for BAs associated with transportation projects. The U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) prepared the *Endangered Species Consultation Handbook* (1998).

Although it describes procedures for conducting consultation and conference activities under Section 7 of the ESA, it provides minimal descriptions of the BA document and its purpose. There was little or no guidance regarding how to address complex issues associated with WSDOT transportation projects. In response to an increase in species listings, the need to standardize BA formatting, and the development of analytical methods agreed upon by WSDOT and the ESA regulatory agencies, WSDOT began offering BA preparation training in 2002. In conjunction with the training, the *Biological Assessment Preparation Advanced Training Manual* was developed by WSDOT to provide a reference and written guidelines for authors. This document has been updated yearly, and the latest version can be found on the WSDOT website. The objective of developing the training and accompanying manual was to ease review and support consultation by providing the information in a logical, accessible manner that is consistent in organization and complete according to WSDOT guidance.

The Oregon Department of Transportation was facing similar challenges, and in 2005, provided training and developed a qualification program for consultants that prepare BAs (ODOT 2005).

WSDOT soon followed suit, and in 2006, modified its existing BA preparation training. To improve the quality of BAs submitted to WSDOT from their on-call consultants, WSDOT started the BA qualification program with specifications for training, a passing grade on an exam, education, and experience. Qualified authors were required to attend trainings and pass an exam every two years to remain qualified. Depending on demand, BA preparation training classes (basic, requalification, or both) have been offered annually since 2006. The WSDOT BA training is generally regarded as some of the most comprehensive guidance for BAs in the United States. Still, it requires ongoing revisions to update the guidance to reflect emerging issues, and changes in consultation processes. The WSDOT Fish and Wildlife program is maintaining a website where our general ESA and wildlife procedures are presented (<http://www.wsdot.wa.gov/Environment/Biology/BA/BAguidance.htm>).

### **Common Flaws in Biological Assessments**

WSDOT BA reviewers, as well as reviewers from the USFWS and NMFS, have identified the most common BA flaws as including 1) careless, unedited documents including awkward or inappropriate cutting and pasting of text; 2) unsupported conclusions; 3) poor or incorrect use of terminology; and 4) incorrect assumptions and interpretations of effects.

BAs often require the use of virtually uniform language or similar information between sections or between documents, tempting the author to cut language from one report and paste it into another. At a practical level, this activity may be unavoidable; however, great care must be taken when doing this to ensure that pasted text is appropriate for the new section or report. Reviewers frequently encounter text that has been inappropriately inserted into reports, rendering the BA ineffective, if not unacceptable.

In addition, authors frequently state their conclusions without having provided the reviewer with enough information to understand how these conclusions were reached. These are often called leap-of-faith arguments, which again render the BA unacceptable. If adequate support for conclusions is not provided, reviewers may not be able to concur with the analysis or the final effect determinations.

### **Essential Attributes of a Successful BA**

The successful BA has three essential attributes:

- It provides adequate justification for an effect determination.
- It leads the reviewer through a discussion of project effects to a logical, well-supported conclusion.

- It contains adequate written description, figures, and graphics to portray the action and its effects on listed or proposed species.

The level of detail and impact analysis provided in a BA should be commensurate with the level of anticipated impacts. Significant impacts should elicit more detailed review and analysis. In addition, analysis of impacts should be related to the species being addressed in the BA.

## **METHODS**

WSDOT has developed a five-part system of providing training and guidance for BA authors. This system consists of a regularly updated BA preparation manual, comprehensive training and qualification program, internet resources, internal review, and interagency coordination.

### **BA Manual**

The *Biological Assessment Preparation Advanced Training Manual* (BA Manual) defines and clarifies the essential components of BAs and the basic ESA Section 7 consultation process, and it also addresses special topics that require careful analysis when producing a BA. Where applicable, examples excerpted from completed BAs are provided in the manual to illustrate how to address various topics in BAs. The introduction section of the manual provides a summary of common flaws in BAs, the essential attributes of a successful BA, and a brief discussion of the types of writing samples provided in the manual. Part 1 of the manual provides an introduction to the process of producing a WSDOT BA and the coordination of the various players in document production and review at the state, local, and federal levels. In addition, part one provides a brief overview of the required components or sections of a written BA.

Part 2 consists of topic-specific chapters that provide detailed information, discussion, examples, and guidance materials pertaining to each topic. The topics include specific BA sections that often pose problems for authors (e.g., the action area), as well as complex topics requiring further guidance (e.g., construction noise impact assessment and developing effect determinations).

Chapters in Part 2 include:

- Construction activities, impact minimization measures, and best management practices
- Action area
- Existing conditions: indicators and pathways analysis
- Indirect effects
- Cumulative effects
- Effect determinations

These address the basic components of a BA while other chapters in Part 2 provide further guidance on complex topics, such as:

- In-water work
- Stormwater impact assessment
- Essential Fish Habitat
- Batched biological assessments and programmatic biological assessments and biological evaluations
- Standards for making effect determinations by species

Part 3 includes standard information that may prove useful to authors in the preparation of BAs, commonly used reference citations, templates, and BA checklists. References to the guidance and documents provided in Parts 2 and 3 are made frequently throughout the manual.

### **Annual BA Author Training/Requalification**

In 2006, WSDOT initiated a qualification process for consultants who write BAs for WSDOT. WSDOT implemented this process to improve the quality of the larger number of documents they were receiving. To qualify as authors, consultants must demonstrate their ability to write BAs through education and experience requirements. They also must attend a training seminar and achieve a passing score on the exam.

Consultants who meet the education and training requirements and have two full years of experience writing BAs are qualified as senior authors. Consultants who meet the education and training requirement, but do not have the required experience can qualify as junior authors. All BAs written for WSDOT must be authored by a senior author who may be assisted by a junior author. Senior authors must ensure that BAs adhere to strict quality control standards in order to maintain their status as qualified WSDOT BA authors. In addition, all BA authors will need to be re-qualified every two years.

WSDOT provides an annual multi-day training course for consultants, and other state and federal agency staff that prepare BAs. Course materials are developed from the written guidance and regular classes, taught by experienced staff under the direction of senior WSDOT staff. This training is required for consultants and DOT biologists. Individuals are provided detailed training in the preparation of all sections of the BA, including complex transportation project issues associated with action area definitions, terrestrial/aquatic noise, stormwater impact assessments, and species effect determinations. Guest speakers are invited to provide detailed instruction in several disciplines. WSDOT noise and stormwater experts provide information on the latest research, and provide project examples where complex consultations were required. Experts from FHWA, USFWS, and NMFS provide presentations on current topics such as the latest habitat guidelines for a listed species.

Individuals that pass the course are considered “trained and qualified” to prepare BAs for WSDOT; however, the skills acquired can be applied to the preparation of BAs for other transportation agencies and most non-transportation situations. By standardizing basic BA preparation, authors understand agency expectations and are aware of the specific effects of transportation projects on species listed under the federal ESA. In addition, the training increases draft BA quality, facilitating the internal review process. WSDOT has trained BA authors from Washington, Oregon, California, Idaho, Utah, and Montana, and its dedicated internet site continues to provide relevant information for anyone involved in preparing a BA.

WSDOT posts a list of authors that have met the qualification requirements and who are working for companies with a WSDOT on-call agreement. WSDOT also posts a list of consultants who have met the BA author qualification requirements, but are working for consulting companies that do not currently have an on-call agreement with WSDOT.

#### *The Training Class*

Training classes are held once or twice a year, depending on demand. The **Basic Class** is required for all students. The class format is three days of lecture, followed by a qualifying test on Day 4. During the first two days, students learn the basics of a BA, including format, terminology, agency communication protocols, and common effects to species from transportation projects. Students are encouraged to study

the manual before the class. The first few pages of each chapter in the BA manual have a chapter summary, and students in the training class are encouraged to study the chapter summaries before the exam. All of the basic material is covered in the WSDOT BA Manual, which is updated prior to the course and provided on-line. Essential Fish Habitat analysis from the Magnuson-Stevens Fisheries Act is also covered, which is integrated into WSDOT BAs by agreement with the National Marine Fisheries Service.

The class format is primarily lecture with PowerPoint slides and handouts. Students also explore several topics through training exercises, which they analyze in groups. Training exercises in recent courses included determining the project action area, effect determinations under various scenarios, timing restrictions, noise examples, and stormwater issues. The groups analyze the problems provided and then discuss their results.

Day 3 is usually devoted to special topics, often with guest speakers. Noise (both terrestrial and aquatic) and analysis of stormwater effects are two issues that are constantly changing and have been regular agenda items in recent years. Students need to be updated on new methods, standards, and agency protocols for analysis of these effects in BAs. Other special topics in 2013 included an update on marbled murrelet, general ESA updates from the preceeding year, indirect effects analysis, marine mammal issues, and general updates on noise methodology.

The **Requalification Class** is for students that had previously taken the Basic Class and had passed that test. These students receive 1 day of instruction (identical to Day 3 of the Basic Class) and then take the exam on the second day. The Requalification Class length can vary depending on the amount of “new” material that needs to be covered.

### *Student Demographics*

The majority of the students are consultants, with a direct interest in writing WSDOT BAs. WSDOT biologists periodically take the course to refresh themselves on BA methods and new ESA developments. Other students include staff from local municipalities, who are interested in becoming better versed in the ESA. Local agency staff write BAs for their public works departments, and often review BAs that are written by consultants for their projects. Occasionally staff from a regulatory agency may attend the class.

The Basic Class usually has 30-50 students, with the Requalifying Class about half that number. It is interesting that during the relatively down economy of the past 5 years, WSDOT has let out fewer BAs for consultants, yet demand for the course has remained high. This may speak to the need for this type of training, be it in a transportation context or perhaps as a general introduction to the ESA.

### *Testing*

The Basic Course test is provided on Day 4. Students are given 5 hours to complete a 200 question multiple choice/short answer test. The test covers both general and specific topics, and students must identify photographs of ESA listed species.

The test failure rate ranges from approximately 10-30 percent, with a score of 70% or higher a passing grade. Students that fail the test are given the choice to take a make-up test.

The Requalification Test had been the same as the Basic Test until 2012. The format was changed in 2012 to the analysis of a hypothetical project. A project scenario is presented with background information on species and critical habitats, and students must determine an action area, decide which species and critical

habitats could be in the action area, analyze project effects, and provide effect determinations with a rationale.

### **Internet Resources**

WSDOT provides post-training support by posting relevant updates on a dedicated internet site (<http://www.wsdot.wa.gov/Environment/Biology/BA/BAguidance.htm>). This popular website is used by consultants, internal staff, and interested parties from other agencies. The site provides an up-to-date BA Manual, and information on recent species listing actions, new monitoring requirements, regulatory agency guidance, and emerging issues such as noise and its effects on terrestrial and marine species. Analytical tools (“calculators”) are available for download and use, as well as templates needed for BAs.

WSDOT has found that in the constantly changing ESA environment in Washington, the website is one of the best ways to distribute information to internal (WSDOT biologists) and external users. Updates are posted approximately twice per month by biologists at WSDOT Headquarters. The benefits of this website include having a centralized repository of current ESA information that allows biologists and consultants to complete consistent, technically sound BAs. It also reduces time spent answering questions from consultants, who are often referred to specific areas of the website.

### **Internal Review**

The Regions and Offices within WSDOT that are producing BAs for consultation have designated an ESA coordinator. This person also provides an important communication function by relaying changes or guidance updates to BA authors and identifying issues or gaps in the guidance. The ESA coordinator is responsible for ensuring that BAs are reviewed by an ESA reviewer prior to submittal to the federal action agency and the ESA regulatory agencies.

ESA reviewers are responsible for reviewing the documents and ensuring that they comply with current WSDOT guidance. The expectation is that BAs will receive review by at least one biologist, other than the author, who is a designated ESA Reviewer before it is submitted to outside agencies. Designated reviewers are responsible for ensuring that the BA complies with WSDOT standards and guidance. These individuals are expected to keep current with changes in guidance and may be involved in mentoring staff and other BA authors. In some cases, the ESA coordinator and reviewer may be the same person. A list of designated ESA coordinators and reviewers for WSDOT offices will be maintained in WSDOT’s Environmental Services Office (ESO) in Olympia. ESO Biology staff in the Fish and Wildlife Program are also available to provide reviews of BAs as needed.

As part of the internal review, it is necessary to include project design and management personnel. The project manager (who has the authority to make project changes if appropriate) needs to be briefed on the BA before it is submitted to the USFWS/NMFS. This briefing should be conducted early enough so that changes can be made to the BA if needed. The intent of this briefing is to involve the project manager in reviewing the project description, minimization measures, and assumptions used for describing the project related to design and construction. If there are aspects of the project that are expected to increase the difficulty of the consultation process, the project manager will have the ability to make project adjustments if possible/warranted. The focus here is on making prudent decisions, avoiding and minimizing impacts as best we can, but recognizing that all impacts may not be avoidable.

## **Interagency Coordination**

Coordination is important between WSDOT and FHWA, USFWS and NMFS to maintain a common acceptance of the information provided, the level of detail, and the type of analysis conducted in the BA. Consultations can be delayed by differences over the adequacy of analysis and expectations can change over time. This is currently addressed through regular coordination with the USFWS, NMFS and FHWA in monthly meetings on an issue by issue basis. A Program Management Team, with representatives from WSDOT, FHWA, USFWS and NMFS, meets once per month to discuss short and long-term issues. Team members have developed and implemented several streamlining tools to reduce the average duration of both informal and formal consultations. These tools include protocols for noise monitoring and fish moving, a standard BA outline, and establishing agreements on methods used to conduct complex impact analyses, such as noise and stormwater effects. An important benefit of this coordination is the establishment of a strong working relationship with USFWS and NMFS; we work together to complete consultations.

## **RESULTS AND DISCUSSION**

To support an efficient ESA Section 7 consultation process, WSDOT needs to produce BAs that supply the information to 1) describe the potential project effects to listed species; 2) determine whether or not the proposed project is likely to adversely affect listed species; and 3) adequately support the conclusions. WSDOT's objective is to ease review and support consultation by providing the information in a logical, accessible manner that is consistent in organization and complete according to agreed-upon guidance.

In an increasingly complex ESA environment, WSDOT meets its objectives by providing guidance, training, and review to BA authors, including consultants and WSDOT biologists. This standardized approach provides authors with clear expectations regarding the content and conclusions in a transportation project BA.

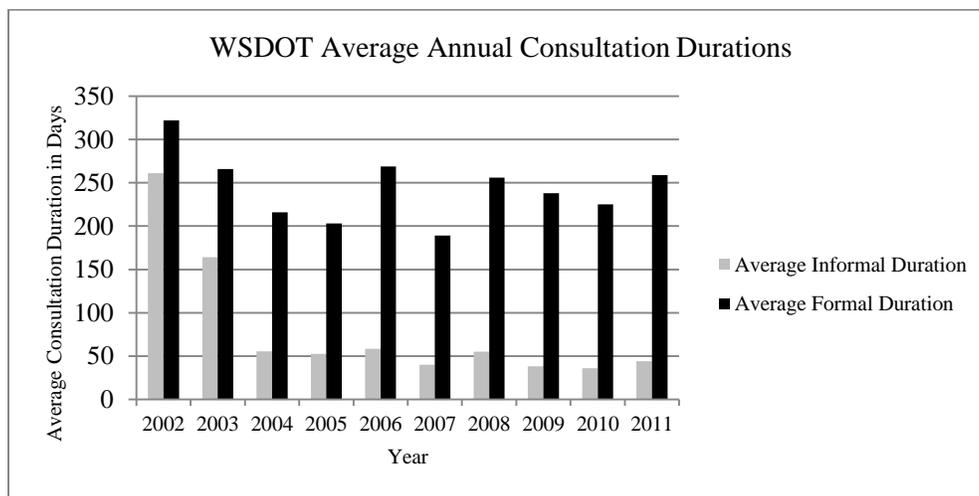
Prior to implementing the training and guidance program, WSDOT did not collect data documenting the number of deficient BAs that were submitted to WSDOT by consultants. As a result, we were unable to directly determine the success of the BA author training, but it was presumed that increasing document quality and standardization were beneficial to the consultation process. Measuring BA training and guidance effectiveness has focused on the changes in the time it takes to complete a consultation. Under the ESA, formal consultations must be completed within 135 days of their submittal dates. Timelines for informal consultations are neither mandated nor specified, but WSDOT, USFWS and NMFS have mutually agreed to complete them within 30 days of their submittal. While WSDOT works with USFWS and NMFS to ensure compliance with the ESA, completing consultations remains the federal agencies' responsibility. Their ability to complete consultations in a timely manner depends upon the availability of qualified staff, workloads, and project size and complexity. USFWS and NMFS consult on projects from a variety of public and private entities. WSDOT provides staff support to USFWS and NMFS to ensure transportation projects receive timely consideration.

Over the last eight years, the average annual duration for formal and informal consultations has exceeded timeline goals, leading to problems in project planning and delivery. WSDOT began collecting limited data on the time it takes to complete consultations in 2002 and officially began tracking average consultation durations in 2004. Average durations are calculated by counting the number of days between submittal of the BA and the receipt of a signed letter of concurrence or a biological opinion from USFWS and NMFS. WSDOT tracks this information to inform project planning and delivery timelines (WSDOT 2013).

When WSDOT started collecting data on consultation duration in 2002, informal consultations took an average of 261 days (Fig. 2). In 2004, after implementing streamlining measures, the average informal consultation duration dropped to 55 days (WSDOT 2013). Since 2004, the annual average duration for informal consultation has varied between 58 days in 2006 and 36 days in 2010. WSDOT is working with the USFWS and NMFS to further develop time-saving strategies such as programmatic permitting for routine WSDOT projects.

Formal consultations also saw a drop in annual average durations after 2002, when the average duration was 322 days (Fig. 2). Since 2003, formal consultations have varied between 189 and 269 days (WSDOT 2013). WSDOT, USFWS and NMFS use the same streamlining tools for formal and informal consultations, but these tools have not resulted in the desired degree of reductions in average annual durations due to the complexity of projects submitted for formal consultations. WSDOT is working with USFWS and NMFS to develop additional time-saving and streamlining measures for formal consultations, but future funding constraints may limit the available resources to complete these measures.

Many factors may affect the duration of consultations; however, the marked improvement following the 2002 BA author training suggests that the program may have had an influence in the average duration of informal consultations. This occurred at a time when the number of formal consultations was increasing.



**FIGURE 2. WSDOT Average Annual Consultation Durations.**

## CONCLUSION

WSDOT faces continuing challenges regarding the training and guidance program. Staffing and funding can be limited, particularly when numerous staff-days are required to prepare for the multi-day courses, conduct the course, grade exams, and provide feedback to participants. Poor economic conditions, coupled with an increase in the use of programmatic biological assessments that cover most areas of the state, have resulted in a reduction in the number of BAs prepared. In addition, WSDOT is striving to produce most BAs in-house, reducing costs associated with the need to employ consultants. This in turn could result in less participation in the consultant qualification program.

Despite existing and future challenges, WSDOT will be continuing to provide BA author training and support. The standardization of basic BA preparation provides authors an understanding of agency expectations and increased awareness of the specific effects of transportation projects on species listed under the federal ESA. Since 2002, WSDOT has trained hundreds of BA authors from Washington,

Oregon, California, Idaho, Utah, and Montana, and its dedicated internet site continues to provide relevant information for anyone involved in preparing a BA. Using a similar standardized approach and training, other state and local transportation agencies throughout the United States can tailor BA preparation to efficiently address existing and emerging listed species issues within their jurisdictions.

## BIOGRAPHICAL SKETCHES

**Jeff Dreier** received a Bachelor of Science from California State University, Chico in 1982. After completing 10 years of service in the U.S. Navy and taking courses relevant to his professional interests as a biologist, Jeff began his career working for Georgia-Pacific Corporation in northern California from 1992 to 1995. As a field biologist, he coordinated annual monitoring of spotted owl reproduction, conducted marbled murrelet surveys, and monitored salmonids in coastal streams. In 1995, he joined an environmental consulting firm in central California. For the next 17 years, Jeff supervised and conducted biological resource assessments, wildlife surveys and habitat assessments, environmental impact analyses, and mitigation monitoring in most habitat types occurring in Nevada and California. Most of his work focused on listed species, including California red-legged frog, California tiger salamander, vernal pool branchiopods, California clapper rail, California black rail, burrowing owl, and bay checkerspot butterfly. Jeff began his career with WSDOT's Fish and Wildlife Program in 2012. Since then, he has been involved with several projects requiring bird monitoring and fish translocation. He is responsible for coordinating annual biological assessment author training, terrestrial species guidance, and is assisting other WSDOT biologists with development of regional programmatic biological assessments.

**Mark Bakeman** is currently a biologist with the Washington Department of Transportation (WSDOT), in the Fish and Wildlife Program. He works on Endangered Species Act issues for the agency, and has primary responsibilities for overseeing programmatic agreements with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service. He assists in project development and related permitting issues within the WSDOT regions. Prior to working for WSDOT, he was a consultant in Colorado and worked on numerous projects within the transportation field. He wrote the first programmatic biological assessment for the Colorado Department of Transportation, and also was instrumental in helping form the first Endangered Species Conservation Bank in Colorado. He has also conducted research projects in several areas: effects of habitat restoration on small mammal populations, effects of off-leash dogs on small mammal and bird populations, fertilization effects on dated wood chemistry, small mammal passage under highways, and formation of mollic soil horizons under cold, forested conditions.

**Marion Carey** is the Fish and Wildlife Program Manager at the Washington State Department of Transportation. She has a Bachelor's of Science in Wildlife Resources and a Masters of Environmental Studies and has been working for the Department of Transportation since 1994. The Fish and Wildlife Program is responsible for providing guidance and assistance on regulations such as Endangered Species Act section 7 consultations, Migratory Bird Treaty Act, and the Marine Mammal Protection Act. The program is responsible for evaluating and developing solutions for the effects of transportation systems of fish and wildlife. Activities include development of a state wide habitat connectivity plan, evaluation of animal vehicle collisions, evaluating the effectiveness of existing bridges and culverts in passing wildlife.

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