**Informational Analyses: Methods and Preliminary Results**

## I. Introduction

The department is completing various analyses that provide information to help the Board decide the department's direction for the rule review of riparian protections in Eastern Oregon and Siskiyou. These analyses are summarized in Table 1.

**Table 1.** Summary of informational analyses for the Board

| Title | Information type | Status |
|---|---|---|
| Stakeholder Survey | Public opinion | Data collected, partially analyzed |
| Stakeholder comments | Public opinion | Data collected, not analyzed |
| GIS | Landscape | Data collected and analyzed |
| Voluntary Measures | Land management | Data collected and analyzed |
| Harvest type | Land management | Data collected and analyzed |
| Compilation of Existing Science | Science | Some data collected, not yet analyzed |
| Study Rigor | Coarse estimates of approaches to review | Data not yet coalesced |

These analyses are described in more detail in the subsequent section.

## II. Analyses and information

### Stakeholder Survey

*Methods*

The department reached out to a variety of stakeholders to encourage input on this rule review. This input includes both at the beginning stage (e.g., the survey) as well as at various steps during the review. We found potentially-interested people through a variety of means, e.g., by talking with ODF field staff, talking with stakeholder groups, and looking online. To help stakeholders better understand this rule review and how they may participate, we shared background information on this process through a variety of means, including meetings, webinars, emails, and phone calls.

We designed a survey intended to solicit both stakeholder's opinions on aspects of this rule review, as well as why they provided the answers they did. The survey included questions about what and where the rule review should address (e.g., issue, stream size and type), as well as background information on participants so that we could understand who participated (see Attachment 4 for the survey and associated cover letter). Stakeholders were emailed a link to the online survey, and had almost 6 weeks complete (the survey ended February 28, 2017).

To encourage as much participation as possible, and conduct an open process, we did not place any restrictions on who may participate: anyone who received the email (including if it was forwarded from someone outside the department) could take the survey. It is therefore important to note that data from the survey are intended to illustrate the range of stakeholder perspectives,

and not what responses received the most votes. We decided to follow this way of characterizing the survey results because anyone could participate, and thus we wanted to avoid the possibility of any group participating more heavily and thus disproportionately skewing the results. To characterize this range of responses, we placed stakeholders into categories to better understand the range of responses.

*Results*

89 people participated in the survey from a wide range of perspectives (Table 2). We are in the process of analyzing the rest of the results.

**Table 2.** Number of stakeholder participants from the various categories.

| Stakeholder category | # of participants |
|---|---|
| Academic | 4 |
| Board Committees | 3 |
| County | 2 |
| Federal agency | 3 |
| Industrial Landowner | 18 |
| Non-industrial Landowner | 7 |
| ODF Staff | 5 |
| Other | 18 |
| State agency | 5 |
| Tribes | 6 |
| Watershed Councils | 7 |
| Conservation | 11 |

Stakeholder comments

*Methods*

In the aforementioned outreach to stakeholders and invitation for them to participate in the survey, we offered people the opportunity to submit written responses by the end of the survey.

*Results*

We received input from eight entities. Additionally, we received input from three Board advisory committees (Committee for Family Forestlands, and the Regional Forest Practice Committees from Southern and Eastern Oregon; Attachment 2). However, we have not analyzed any of these written comments, or assessed how they relate to those obtained in the stakeholder survey.

GIS Analysis

*Methods*

The goal of the GIS analysis is to provide the Board with contextual information on how streams of different sizes and types are distributed across ownerships on forestlands.

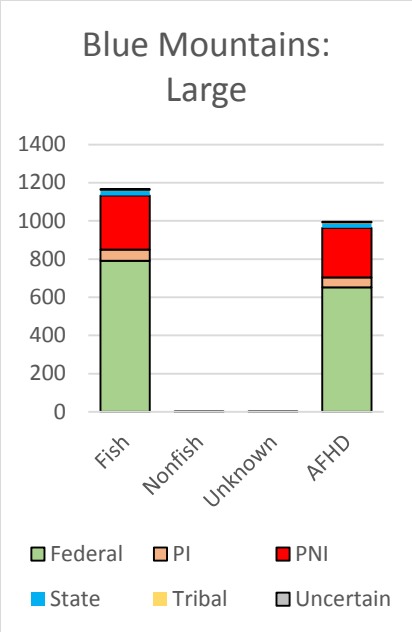
ODF determined the length of streams by stream size (Small, Medium, and Large) and stream type (Fish (F), Nonfish (N), Unkown, and Anadromous fish habitat distribution (AFHD)) on forested lands. Analysis was performed using the official ODF Streams feature class. This classification revealed a large proportion of streams are unclassified. These streams were manually reclassified using a Modeled Physical Habitat feature class. Analysis of AFHD streams relied on a 2014 draft AFHD feature class prepared by the Oregon Department of Fish and Wildlife. Streams from both feature classes were intersected with the ODF FPA Geographic Regions feature class to determine the length of stream within each geographic region.

Visual examination of mapped streams indicated a large number of streams that were classified as small, where this was unlikely to be the true classification of the stream. This was most prevalent on land that was not subject to the Forest Practices Act, such as National Forest land. For the purpose of this analysis, watersheds with a high proportion of apparently misclassified stream sizes were reclassified using methods described in Forest Practices Technical Note #1.

The extent of forested land ownership was determined using a Forested Ownership GIS feature class with 100 meter resolution. Both the ODF Streams feature class and the AFHD layer were intersected with the Forested Ownership layer to determine the length of stream on forested land by ownership.

*Results*

The GIS analysis results are presented in Figure 1. Across all three geographic regions, there is a trend of decreasing proportion of miles of types F and AFHD streams and increasing proportion of type N streams, going from large to small streams. Additionally, there are many more miles of small streams than medium or large. Blue Mountains has more miles of medium streams than large streams, whereas the other two geographic regions have more miles of large streams than medium streams. There are more miles of streams on federal lands than any other category for all stream sizes and types in each geographic region, except large streams in Siskiyou where there are more miles of private nonindustrial (PNI). In geographic regions, there are more miles on PNI than private industrials (PI) for all stream sizes and types, except the Eastern Cascade has more miles of PI than PNI for medium and small streams. Eastern Cascade is the only geographic region with a large proportion of miles of all stream sizes in tribal ownership. Comparisons of absolute miles of streams between geographic regions is not discussed here since the geographic regions have different areas (and, thus densities of streams), for which we have not accounted.


Blue Mountains: Large
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1200
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Fish
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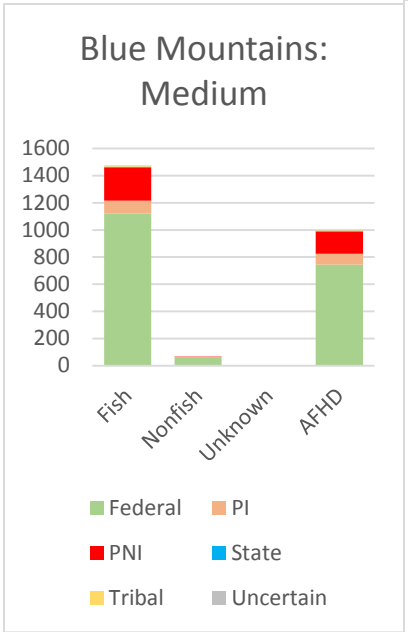
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Fish
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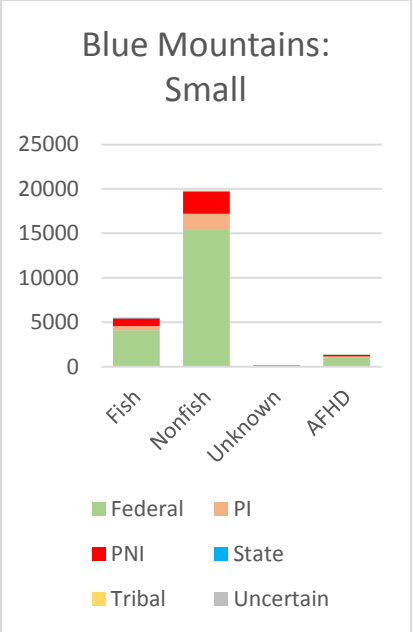
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20000
15000
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Fish
Nonfish
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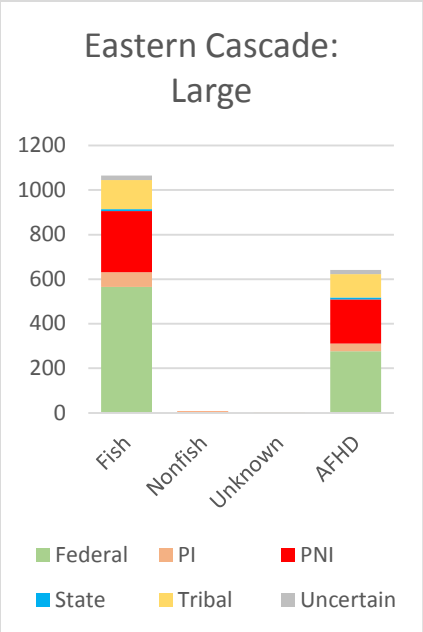
Eastern Cascade: Large
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Fish
Nonfish
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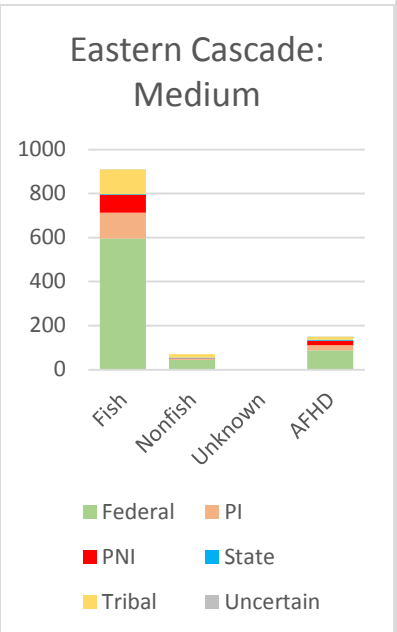
Eastern Cascade: Medium
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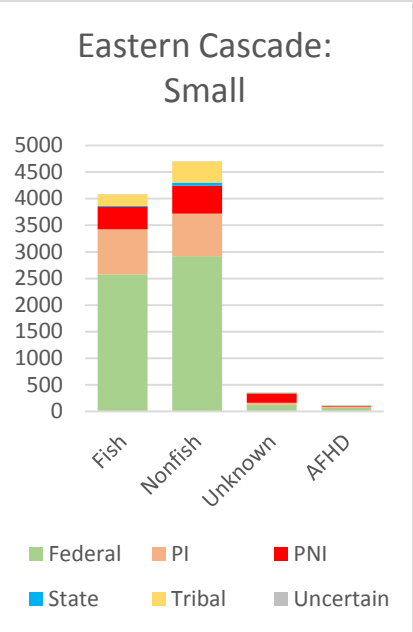
Eastern Cascade: Small
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4000
3500
3000
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1500
1000
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Fish
Nonfish
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State
Tribal
Uncertain

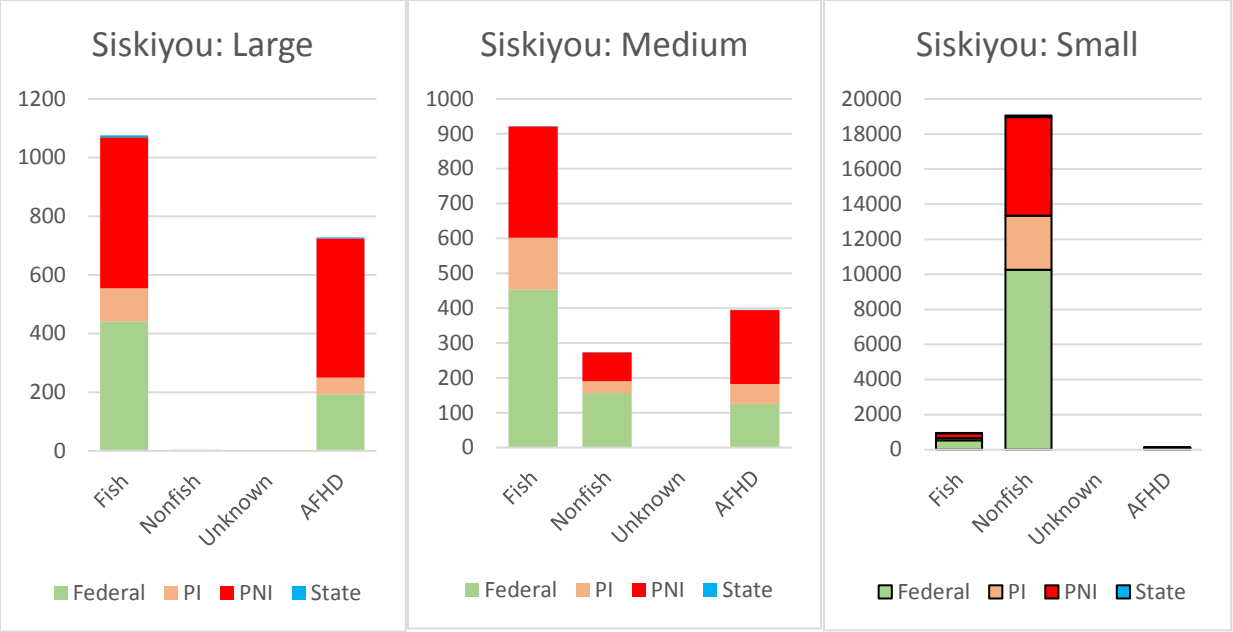


**Figure 1.** Miles of stream types by ownership, stream size, and geographic region.

Voluntary Measures

*Methods*

The voluntary measures data were downloaded from the Oregon Watershed Restoration Inventory (OWRI) database on 1/5/2017. The data include projects that were reported from 1995 to 2014.

To create a heat map, we filtered the voluntary measures data to unique project numbers (i.e., only one point per project). We then used the kernel density tool in the Spatial Analyst extension to create a raster of density values. The output cell size was set at 300 ft and search radius was set at 21,120 ft. (4 mi.). The area units option was set as "square miles" and the method used was "planar". Because the data were extensively smoothed, it is more appropriate to interpret densities as relative values (i.e., high vs low) rather than as absolute values (i.e., # of projects per square mile).

*Results*

There is a lower density of watershed restoration projects reported to OWRI east of the Cascades than in the Siskiyou (Figure 2). It is important to note that this lower density of reported projects may be due to landowners not reporting, rather than fewer projects being installed. Anecdotally, there is a larger portion of forestland acreage east of the Cascades managed by families than by industry, and these former landowners may have a lower rate of reporting completed projects. Family forestland owners also likely have fewer funds with which to complete voluntary measures. Finally, this map does not distinguish between types of projects implemented to restore watersheds.

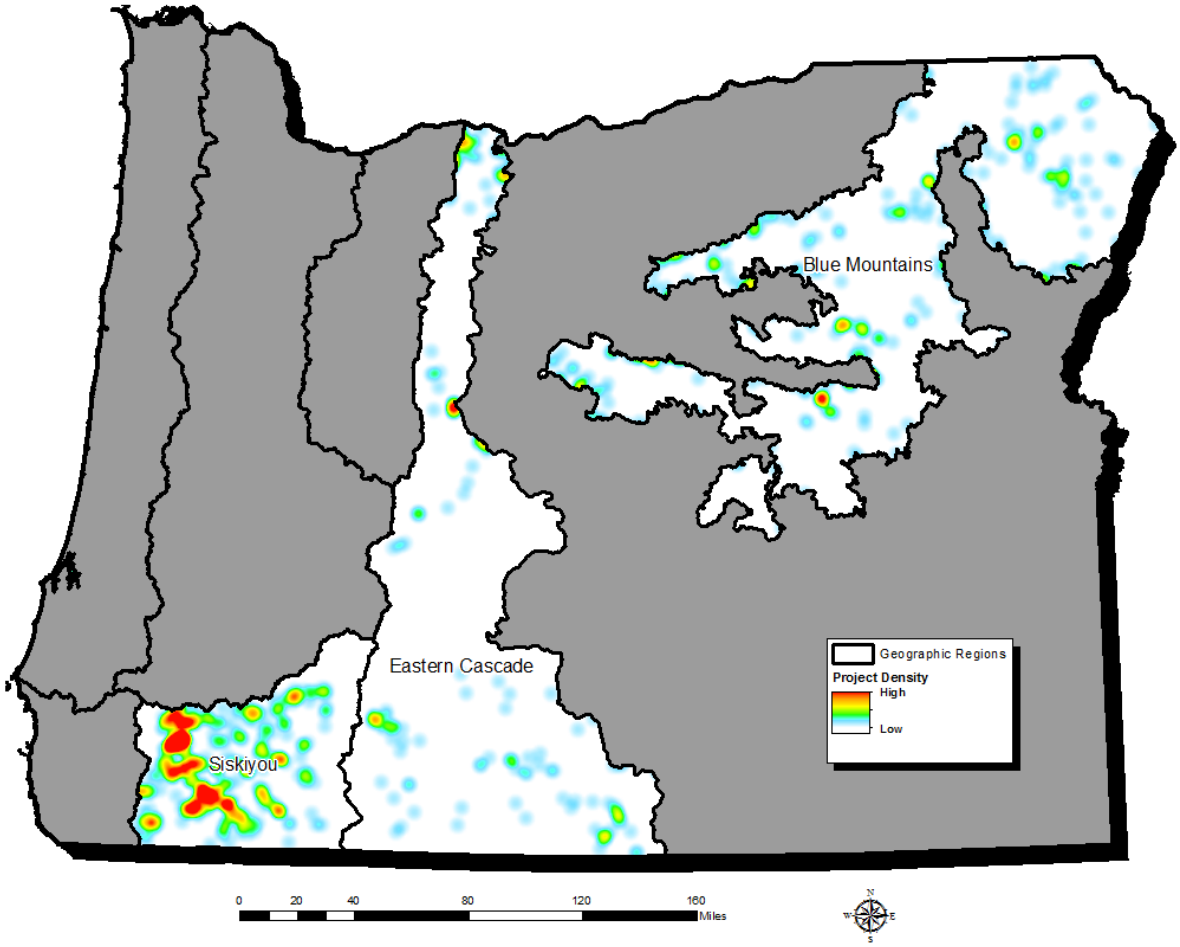


**Figure 2**. Map of densities of voluntary measures projects implemented from 1995-2014 that were reported in the Oregon Watershed Restoration Inventory database.

Harvest type

*Methods*

Current harvesting patterns were evaluated by examining harvest notifications submitted by landowners through the FERNS notification system between October 2014 and September 2016. Harvest patterns were described by calculating the percentage of notifications in each Stewardship Forester Area that were reported as clearcut harvests.

*Results*

Figure 3 indicates that the Siskiyou and eastern Oregon tends to have fewer clearcut harvests than western and northwestern Oregon. Anecdotal evidence suggests this is due to a combination of natural regeneration working well with seed tree harvest techniques vs. the full cost of reforestation for a traditional clearcut harvest operation.

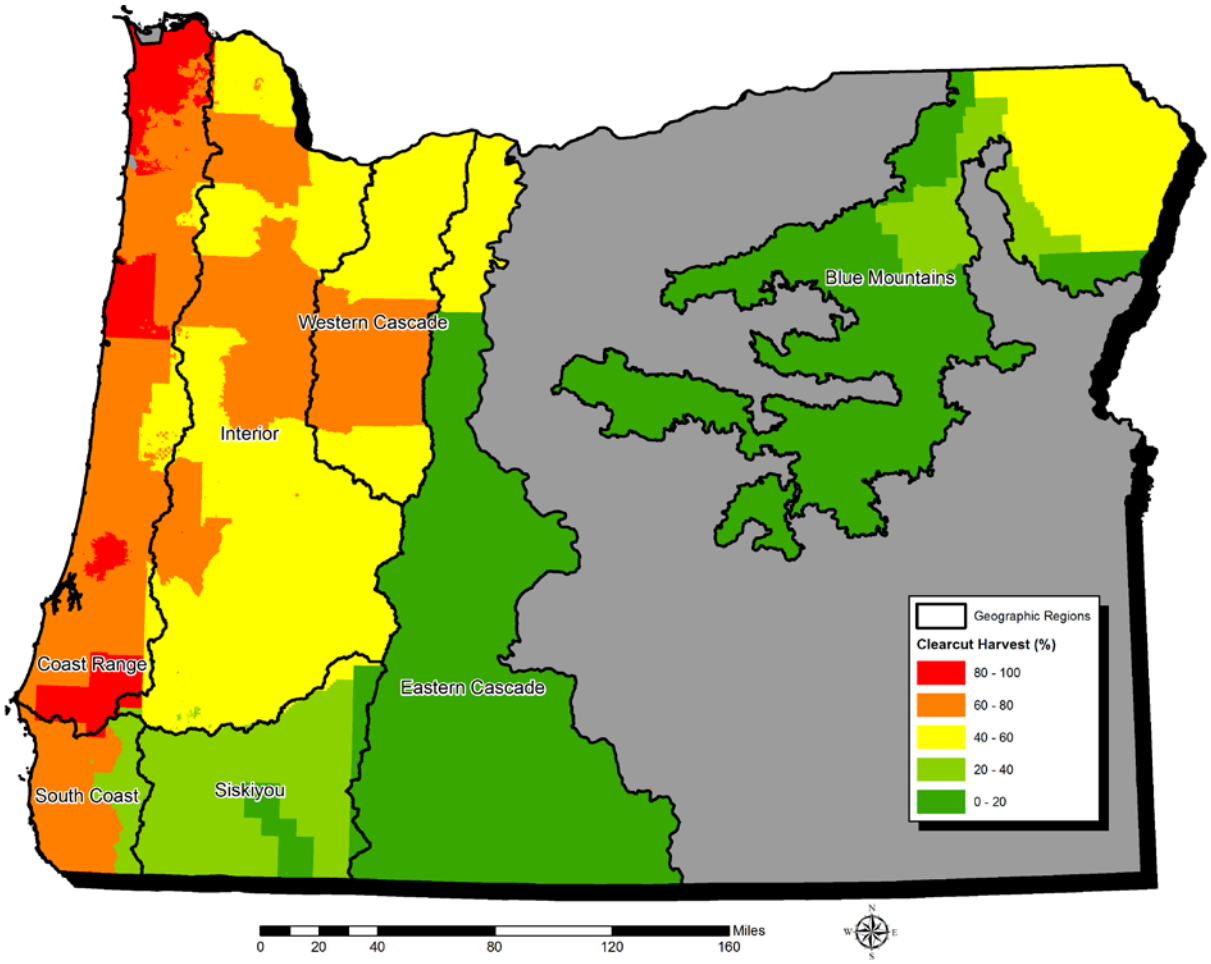


**Figure 3.** Percentage of notifications for harvest that were clearcut.

Compilation of Existing Science

*Methods*

While we are not doing a literature review, we are assessing the potential relevance of scientific data to each issue. We searched the Scopus database for publications that may be relevant to inform a literature review for each issue. We used a set of key words that delimit the geography and topic. Additionally, we asked stakeholders and partner agencies for relevant information. Finally, we will be searching for information that is not strictly published (e.g., TMDL reports, status and trend data large wood or water quality data) and thus may be missed in searching a database. This information may provide relevant data that are useful to either assess rule effectiveness, or help with monitoring study design.

*Results*

We found 1,149 potentially relevant publications through the database search. However, we have not finished determining which studies may be relevant to the different riparian protection issues under consideration. The remaining data have not yet been collected.

Assessment of requirements for various levels of study rigor

There are several levels of study rigor with which the department could address a rule review (Table 3 illustrates the type of information we will bring to the Board). For the purposes of this discussion, we describe the attributes of the study approaches in a brief manner, recognizing there are numerous nuances that we do not address at this stage. A conventional literature review consists of assessing information gleaned from studies, and writing a narrative about this assessment. A systematic review is a more rigorous literature review designed to minimize author bias, and lends itself well to including stakeholders in the process. To complete both types of literature reviews in a manner that can inform policy decisions, there needs to be an adequate number of relevant studies.

Alternately, a field study may be warranted. Such studies can have vastly different intensities of study design, data collection, and analysis. On one extreme, the Riparian Function and Stream Temperature project (RipStream) was started in 2002, and although data collection ended in 2010, analyses are ongoing as of summer 2017. To date, we have over 10 RipStream analyses either completed or underway, a number of which are published journal articles. On the other extreme are projects such as the leave tree pilot study (Weikel and Krahmer, 2006). It entailed approximately 1 season of field work at 5 harvest units, and had 1 technical report. A monitoring project of moderate complexity would roughly entail six months to a year to plan, 1-2 field seasons to complete, and six months to a year for analysis with an end product being a department technical report.

**Table 3.** Summary of study approaches, with numbers given for addressing a single issue.

| Study approach | Time to complete | Number of FTE staff involved/cost | Confidence in results/feasibility |
|---|---|---|---|
| Literature review | | | |
| Systematic review | | | |
| Light field study | | | |
| Intensive field study | | | |