8.0 Action Area

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Chapter Summary

- There is only one action area defined for a project.
- The action area is not determined by the extent of impacts on species and habitat; rather, it is determined by the geographical effects of the action on the environment.
- Each project has only one action area, not separate terrestrial and aquatic action areas.
- The action area should be defined in the Project Action Area section of the BA.
- A map or figure showing the action area should accompany the verbal description of the action area.
- Steps to be completed in order to define the action area are these:
    1. Identify all project impacts.
    2. Determine the geographic extent of each type of project impact to define a zone or area of project impacts for each.
    3. Overlay the multiple zones or areas of project impacts in combination to establish the geographic extent of all project impacts.
    4. Define the action area based upon the farthest geographic extent of potential project impacts.
- The action area may include discrete areas where project-related impacts may occur in isolation from the primary area of anticipated project impacts.
- Within the single action area, project biologists may choose to discuss some of the zones of impact previously defined, to facilitate report organization and analysis of effects.

This section provides guidance for defining the limits of the action area. BA excerpts are provided to illustrate how the project biologist can effectively define the limits of the action area.

8.1 Defining the Action Area

The general location of the project action area should be described in the BA. A map, legal description, and photographs (aerial or ground) can help to illustrate the context and extent of the project action area.

A project biologist's first task is to define the specific limits of the project action area. The limits of the action area should be based upon the geographic extent (in both aquatic and terrestrial environments) of the physical, chemical, and biological effects resulting from the proposed action, including direct effects and delayed consequences, as well as effects of interrelated and interdependent activities.

The project biologist should provide clear justification of the action area limits so that BA reviewers can follow the author's line of thought and reasoning. The author should also provide reviewers with enough information to determine the accuracy of the limits defined.

> *Often, project biologists incorrectly identify the action area. The action area should be based on how far all effects of the action reach, not simply how far the impacts related to project equipment extend.*
>
> *For example, if an effect of an action (e.g., dewatering) can be detected 150 miles downstream of the project area, the entire 150 mile stretch of river would be included in the action area, as defined by the project.*

Each project has just one action area, which is usually larger than the project site or footprint. The single action area for the project encompasses the extent of all direct effects and delayed consequences related to the proposed action (as well as interdependent or interrelated activities) affecting both aquatic and terrestrial environments. In some situations, it may be necessary to define a very large action area to address all project-related effects. The number of species addressed in a BA or their presence or absence in the vicinity of a project plays no part in defining the action area for the project.

Action areas are three-dimensional, encompassing impacts above and below the water surface. Often the underwater portion of the action area has a size and shape different from the portion of the action area located above water.

To define the project action area, a project biologist should complete the following steps:

1. ***Identify all potential project effects***.
   This includes all direct effects and delayed consequences, as well as those effects associated with interrelated and interdependent activities, occurring within both aquatic and terrestrial environments.

   Note that some project elements should not be included in the action area. This would include commercially purchased materials and their haul routes (i.e. bridge girders or gravel from an established commercial gravel pit etc.) Detour routes over existing roads should not be part of the action area unless traffic volumes will be drastically increased thus resulting in increased noise levels. However, the creation of a new permanent or temporary detour road or bridge should be part of the action area.

2. ***Determine zones of effect for each type of project effect***.
Look at each type of project-related environmental effect (i.e., in-water sedimentation, stormwater, terrestrial noise, underwater noise, clearing and grading, induced development, traffic, fish habitat gain, etc.) separately to determine its geographic extent.

3. ***Determine the geographic extent of all project effects***.
Once the project biologist has identified zones representing the geographic extent of each type of project-related environmental effect, these zones can be combined to form a single representation of the geographic extent of all project effects.

4. ***Define the action area***.
The action area is defined by the outermost extent of all the zones of effect combined. The outer limits of the action area may be defined by the zone of effect identified for one type of project effect that extends farther than any other, or the limits of the action area may be defined by a combination of multiple zones of effect. In some instances, there may be discrete areas affected by project activities that are not contiguous with the other zones of effect (for example, an offsite mitigation area). In these cases, the isolated area affected by project-related activities need not be physically lumped into the action area but can be considered a separate component of the action area.

8.1.1 Terrestrial and Freshwater Projects

Defining the geographic extent of potential effects is often difficult. For example, delineating the limit of noise impacts, or determining how far noise will travel from a specific location before attenuating to background levels, can be speculative. In the past commonly accepted thresholds were often used for terrestrial areas (e.g., a 1-mile radius for pile driving activities and ½ mile for construction noise) However these thresholds should be refined based upon an analysis of site-specific background sound levels and the predicted distance noise levels will travel before attenuating to background conditions. The geographic extent of project-related noise underwater can extend well beyond the radius defined for terrestrial impacts, depending upon surrounding bathymetry, water temperature, and other factors (see PART 2, NOISE IMPACT ASSESSMENT for more detailed information on analyzing noise impacts).

Estimating the maximum downstream distance through which sediment or pollutants can affect water quality also may be speculative. Contaminants in stormwater can be transported far from the point of delivery either dissolved in solution, attached to suspended sediments, or through bioaccumulation. Water currents may transport contaminants that are in solution or suspended far downstream to large rivers, estuaries and the ocean. The fate and transport of many stormwater constituents in the environment are not well known. For individual consultations, use the guidance in Chapter 17 to define the extent of potential stormwater effects when describing the aquatic portion of the action area in freshwater systems. There is no existing guidance for direct discharges to marine waters. In those cases, discussions with the Services during early coordination will be required.

8.1.2 Marine Projects

In the marine environment, it is important to consider the various sources of noise associated with pile driving, including impact driving of various diameters and types of piles, and both removal and installation of piles using vibratory methods. Each method has its own zone of effect, and each affects aquatic species in different ways. In addition, other effects associated with marine projects include removal of creosote-treated structures, suspension of contaminated sediment, turbidity, and stormwater.

When discussing in-water transmission of sound generated by impact pile driving, noise is usually described in instantaneous peak sound pressure levels decibels (dB_{PEAK}), which is the maximum overpressure or underpressure observed during each sound pulse. Vibratory pile driving is usually measured as the root mean square (RMS) pressure level during the sound impulse. RMS levels are also used to describe disturbance level effects to marine mammals, and are the measurement used to establish background in-water noise levels at the project site.

Since marine mammals can be grouped into five broad functional groups based on the frequencies that they can hear in, background underwater noise levels will be reported by frequencies which match the hearing ranges of the functional hearing groups. A broadband noise level will also be reported. (See the noise chapter for more information.) When completing a marine in-water pile installation consultation, the extent of effects should be calculated for the action area by using the lowest reported background number (not the broadband number) to calculate the furthest extent of effects. For example: at the Southworth Ferry Terminal the background daytime dB values are 124 dB broadband, 123 dB for low frequency cetaceans, 121 dB for phocid pinnipeds, 118 dB for otariid pinnipeds and mid-frequency cetaceans, and 117 dB for high frequency cetaceans – thus the project would calculate how far out the sound generated by the pile with the highest source number, would travel until it was indistinguishable from the background frequency of 117dB, the lowest background value for all of the hearing frequency groups. As a rule of thumb – the higher the source number, and the lower the background number, the greater the extent of effects.

The extent of effects within marine environments from pile installation or removal can be extensive. For example, using NMFS's practical spreading model, the 191 dB_{RMS} generated by impact pile driving of 36-inch diameter steel piles would attenuate to a background level at approximately 115 miles from the source. However, the in-water extent of effects is frequently bound by the nearest land.

The action area in marine environments is typically defined by predicted noise levels from impact pile driving. Based on the distance at which in-air propagation of pile driving noise attenuates to background levels, the in-air extent of an action area in the marine environment can be determined. The in-water extent of the action area is frequently bounded by the nearest land. The extent of in-water effects also includes areas affected by temporary turbidity increases.

8.1.3 Example of Process for Defining Action Area

This section provides two examples of how the action area for a project is defined. The first example shows how an action area is determined based upon the zones of impact defined for multiple project elements. The second example illustrates how an action area is defined in an aquatic environment, based upon anticipated noise impacts above and below the water.

The first example illustrates how the overall action area for a project is composed of the combination of multiple zones of effect that reflect potential impacts associated with each project element. In this example, the action area is defined based on the extent of project-related noise and the extent of project-related aquatic effects. The proposed project consists of roadway widening and replacement of a culvert. Figures 8-1a, 8-1b, and 8-1c show: 1) the overall action area, 2) the extent of project-related noise, and 3) the extent of project-related aquatic effects.

1. The first step in defining the action area is to identify all potential project effects. In this example, there is construction and pile driving noise associated with roadway widening and culvert replacement activities. The aquatic effects include potentially increasing downstream turbidity and providing 1,600 feet of upstream fish passage to a stream segment that was previously impassable. In this example, assume all stormwater runoff generated by new and replaced pollution-generating impervious surface is 100 percent infiltrated

2. The second step is to define the zone or area affected by each type of anticipated project-related effect. These zones and the rationale for establishing their limits are described in the text within Figures 8-1b and 8-1c.

3. The third step is determining the geographic extent of all project impacts. By combining or overlaying the zones of effect illustrated in Figures 8-1b and 8-1c, the project biologist can determine the geographic extent of all project effects (Figure 8-1a). Some projects may have multiple zones of effect that need to be considered simultaneously.

   Based on this combination of all relevant affected areas, the project biologist can then delimit the action area. The action area limits outline the outermost extent of contiguous project-related effects, plus any outlying areas that will sustain project-related effects (such as a wetland mitigation site).

The second example illustrates how an action area is defined for a project involving in-water pile driving. Although other effects such as stormwater runoff, sedimentation or turbidity could also be generated by project activities, this example assumes that these zones of effect are confined within the area affected by project-related noise. Since the extent of project-related noise represents, geographically, the most far-reaching project effect, the limit of noise impacts is also considered the limit of the action area This example also illustrates the different attenuation rates of noise above and below water, demonstrating that noise impacts must be considered in a three-dimensional fashion. Figures 8-2a and 8-2b illustrate the aerial and underwater extent of the action area defined for this project, respectively.

For a marine example, refer to the Noise chapter (7.0).

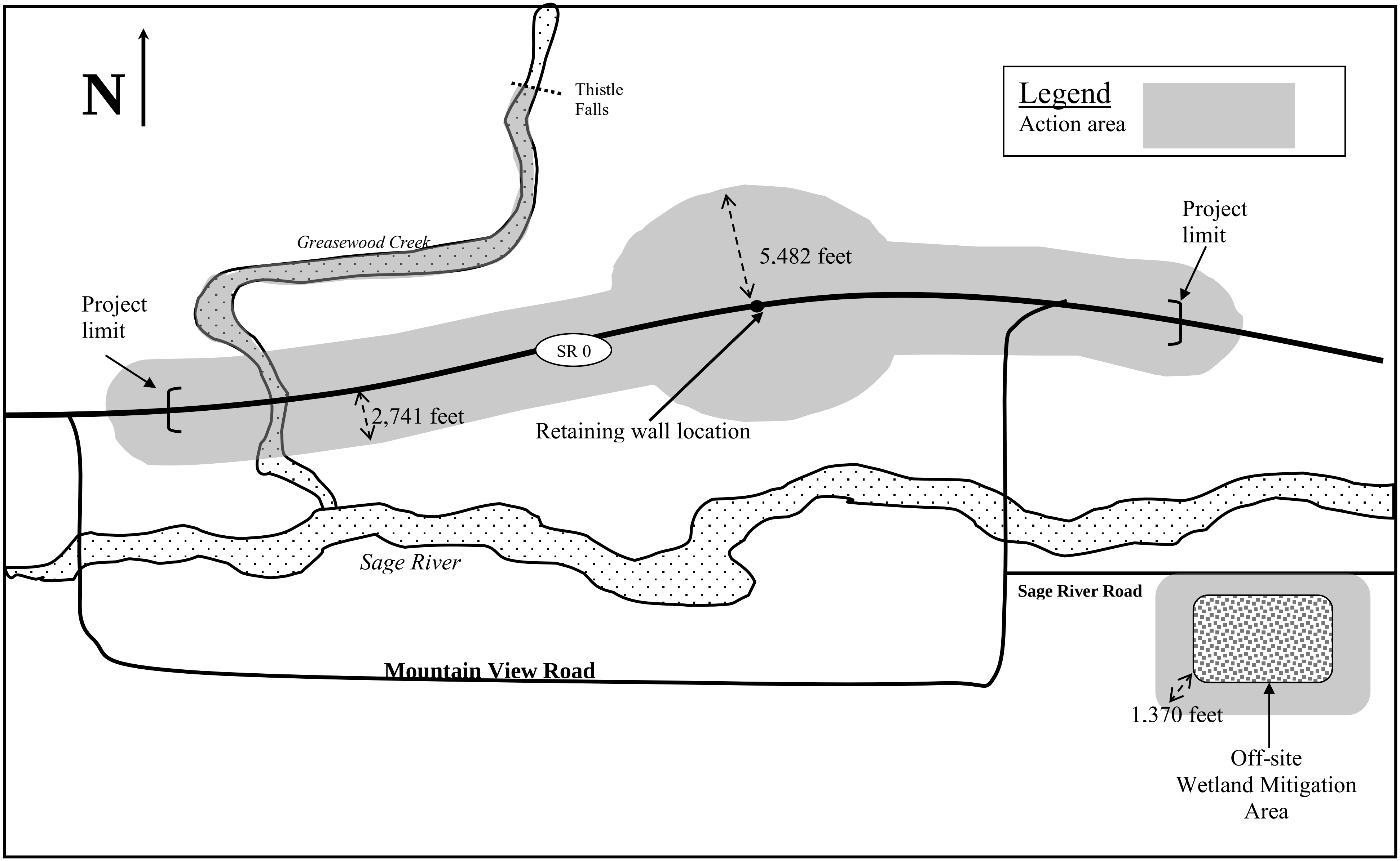

Figure 8-1a. Example showing project vicinity and action area limits.

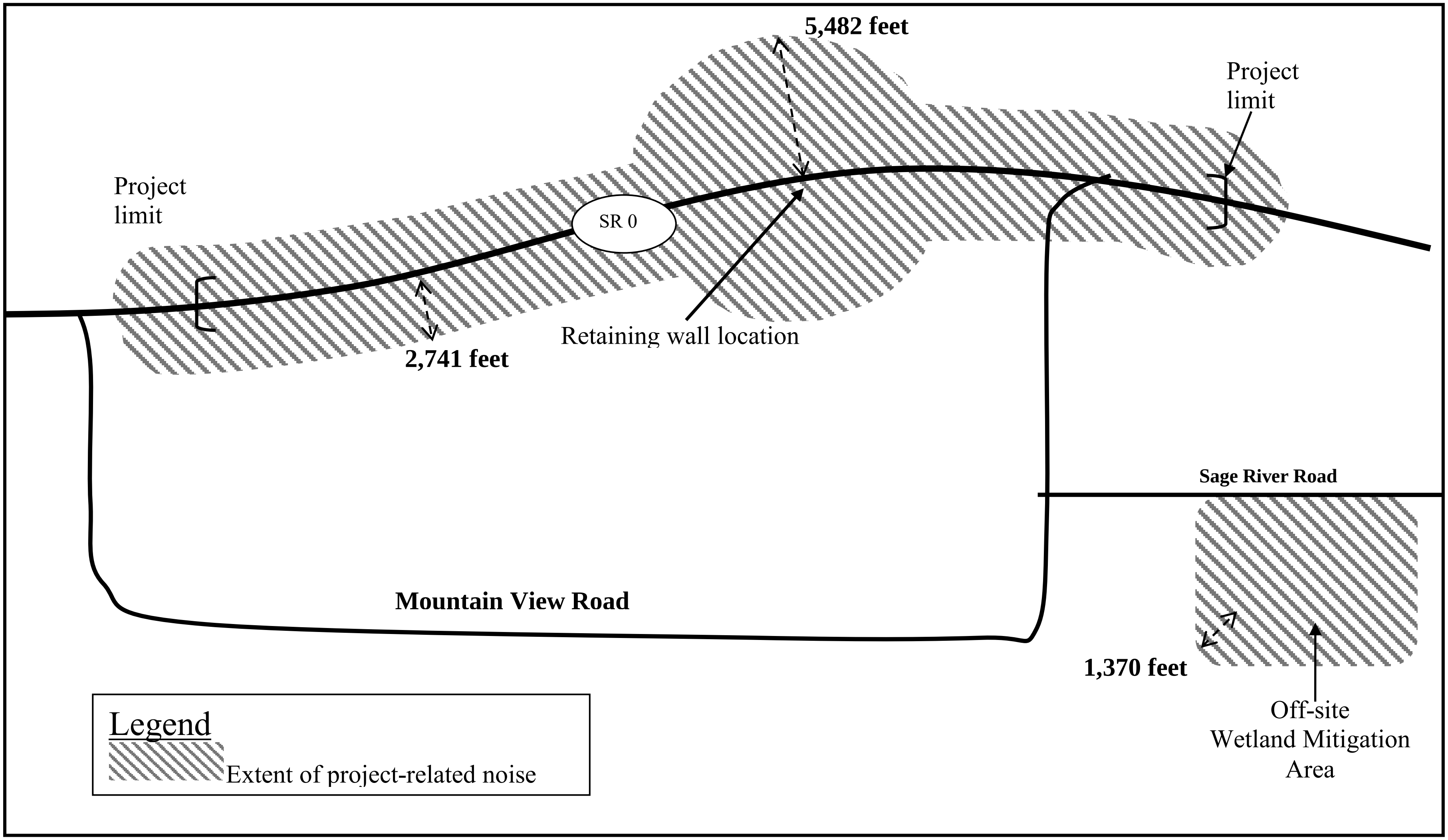

Figure 8-1b. Example showing extent of project-related noise.

The project consists of roadway widening, retaining wall construction, and a culvert replacement. The project limits shown above are the beginning and end points for the widening corridor. Noise associated with roadway widening is expected to extend 2,741 feet from the roadway. Construction of the retaining wall requires impact pile driving, and the extent of construction noise expands to 5,482 feet around this activity. The culvert replacement requires closure of SR 0 so traffic will be routed to Mountain View Road. A wetland mitigation site will be constructed near Sage River Road. Due to construction equipment noise at the mitigation site, project-related noise extends 1,370 feet around the wetland mitigation site.

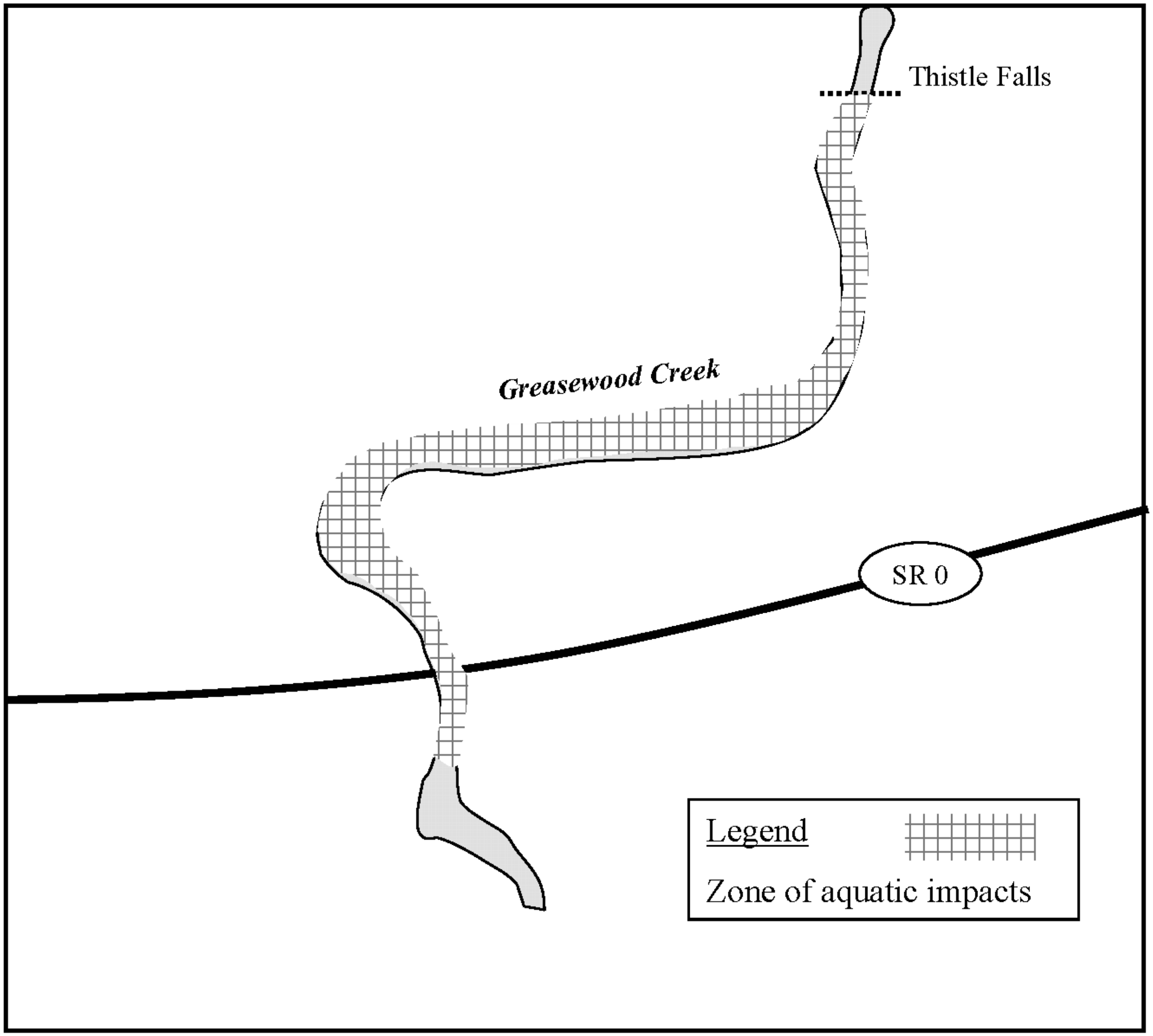

Figure 8-1c. Example showing extent of project-related aquatic effects.

The project will conduct in-water work by replacing a failed culvert on SR 0 over Greasewood Creek. The culvert has not allowed fish passage for several years, but after project completion, fish can access upstream habitat to Thistle Falls, which is an impassable natural barrier. This access to habitat is a beneficial effect, and therefore constitutes a project-related aquatic effect.

Aquatic effects extend from 300 feet downstream of the project area (*WSDOT–Washington State Department of Ecology Water Quality Implementing Agreement*) to approximately 3 miles upstream (Thistle Falls).

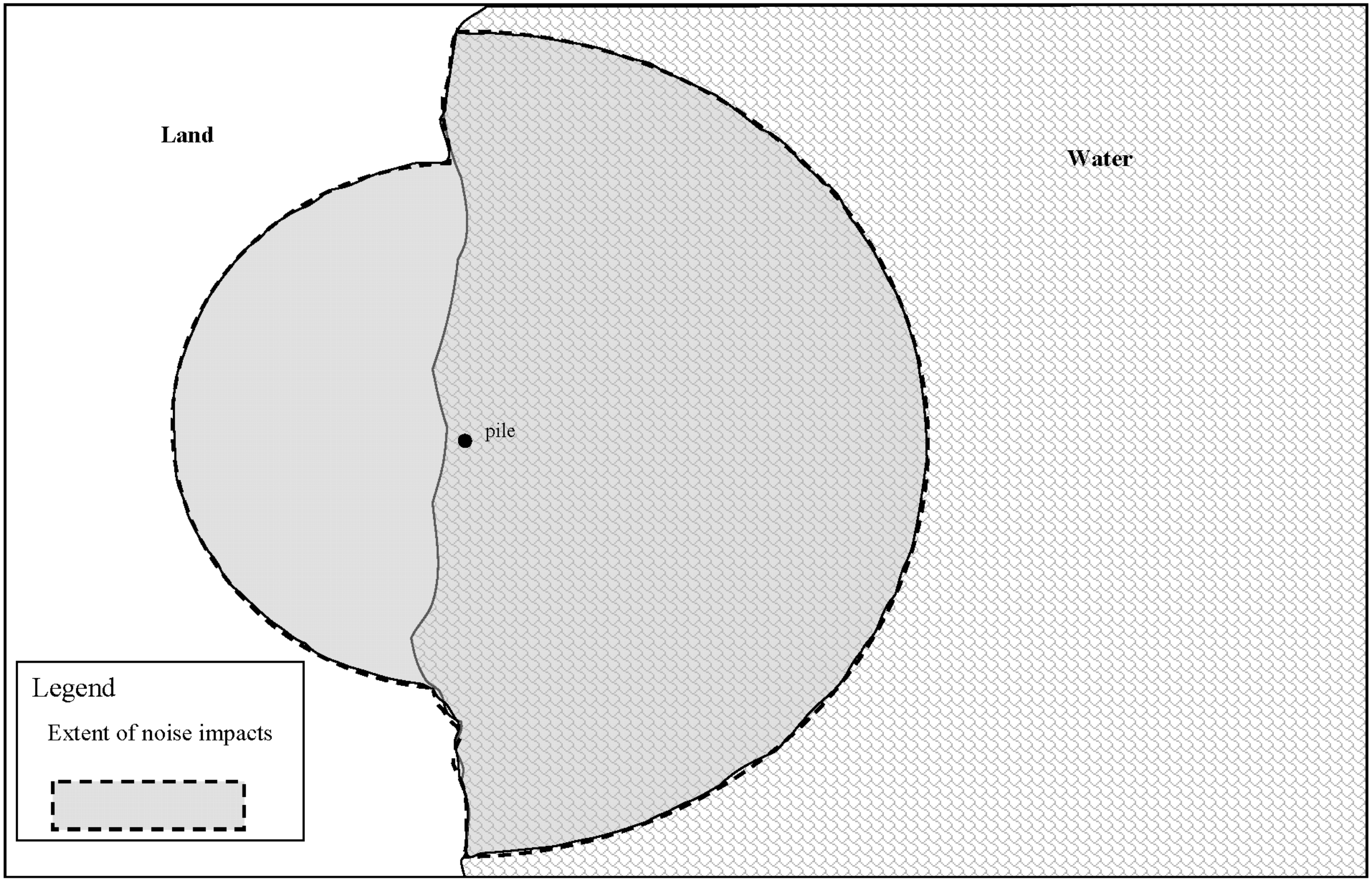

Figure 8-2a. Extent of project-related noise from in-water pile driving (plan view).

This example shows the approximate extent of project-related noise (over land and water) resulting from in-water pile driving activities. Noise attenuates at different rates over land (soft site) and over water (hard site), which explains the difference in radii. The limit of project-related noise is the distance at which noise from construction is indistinguishable from baseline noise.

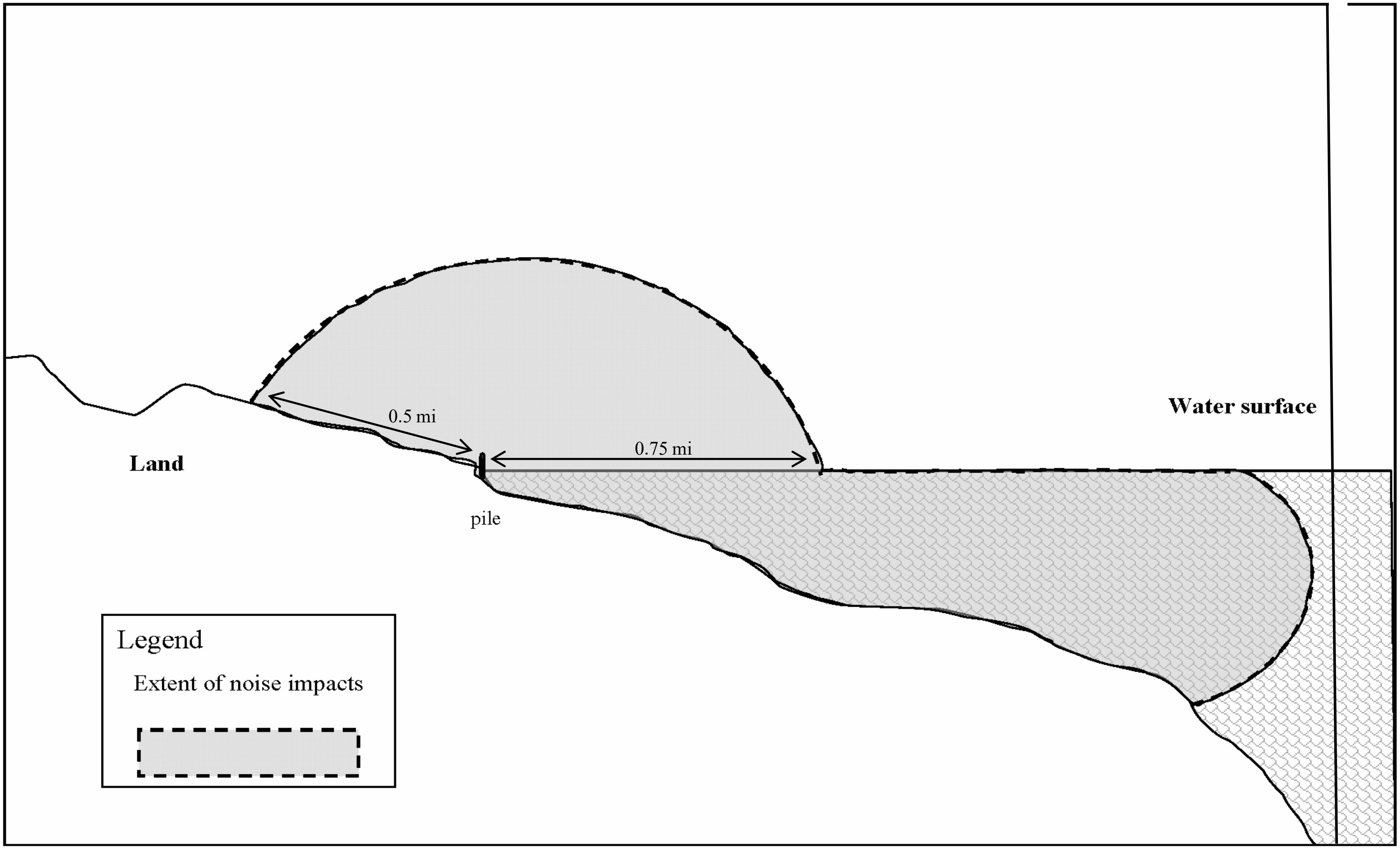

Figure 8-2b. Extent of project-related noise from in-water pile driving (cross-sectional view).

This example displays the 3-dimensional aspect of noise extent. Note the difference in radius between over-land and over-water spreading.

8.1.4 Sample Biological Assessment Descriptions

One example of how to define a project's action area, accompanied by an aerial photograph illustrating the extent of the action area (Figure 8-3), is provided below. The project entails rebuilding a bridge along SR 0. The action area encompasses the direct effects of the proposed action (noise and sedimentation/hydraulic impacts) as well as effects associated with the equipment access routes to be used for the project. In this example, the outer limits of the action area are determined by combining these multiple zones of effect.

The action area includes all areas that could be affected by the proposed project and is not limited to the actual work area. Noise and disturbance from construction activities have the potential to extend 500 feet outward from the project area. Project-induced sediment conveyance and hydraulic effects could affect Dogwood Creek and its stream banks up to 250 feet upstream of the bridge and 500 feet downstream of the bridge (Figure 8-3). Equipment access routes will generate impacts on both banks of Dogwood Creek, but these access routes are within the 500-foot action area.

Consequently, the action area has a radius of 500 feet in all directions from the project footprint, encompassing noise, equipment access, and sediment/hydraulic zones of effect. These distances are established with the confidence that they include all areas of conceivable impact associated with the proposed project.

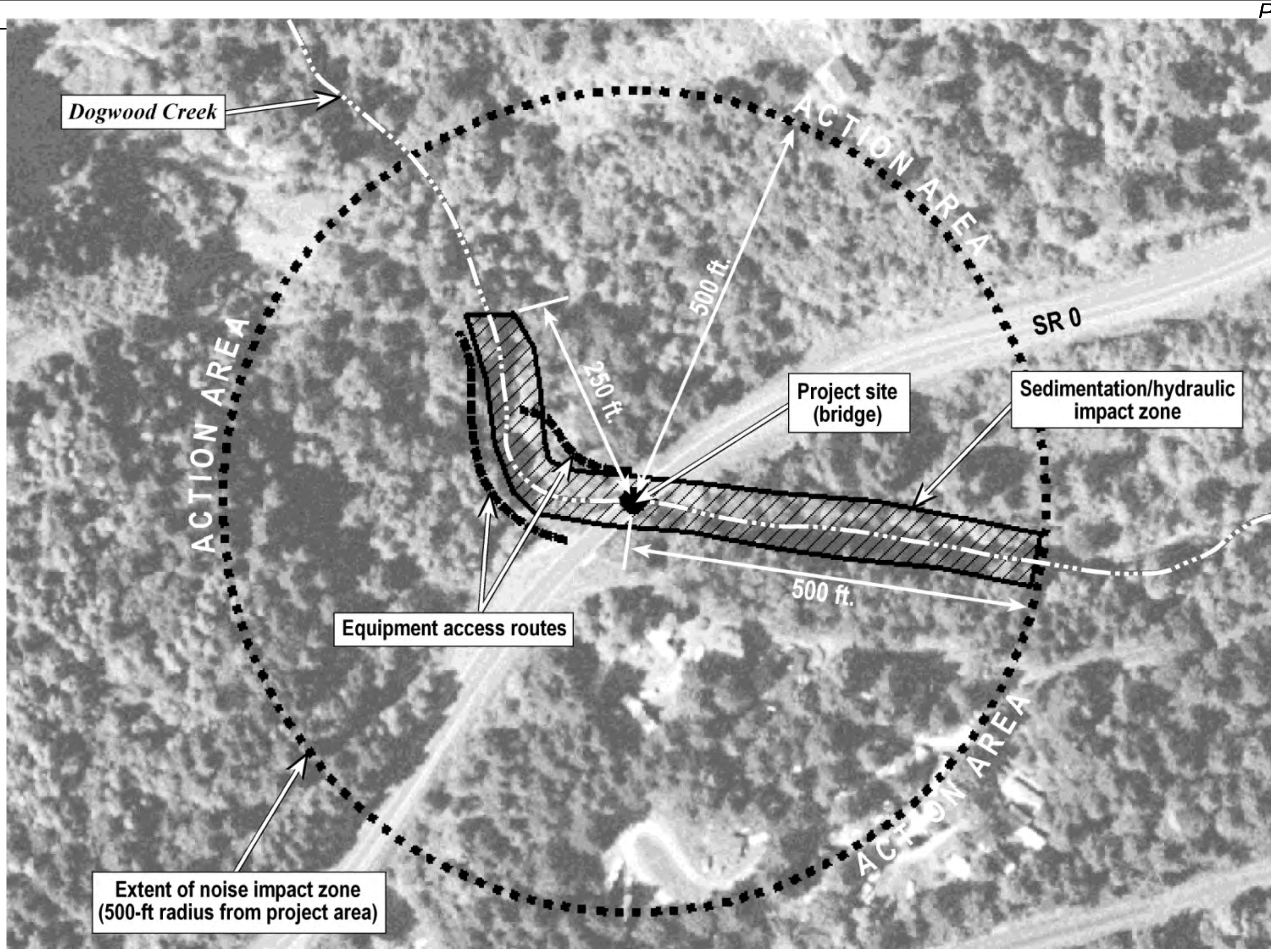

Figure 8-3. Detail of project action area including zone of effect for project-related noise sedimentation/hydraulic effects, and effects associated with the equipment access route