Standard Conservation Measures for project development in Oregon spotted frog habitat of Washington State

HOW TO USE THIS DOCUMENT

If you are designing a project in Oregon spotted frog habitat or designated critical habitat in Washington State (see Appendix II: "Is federally threatened Oregon spotted frog or its critical habitat in your Washington state project area?") then please consider the below Conservation Measures to decrease the potential to cause negative impacts to the species and its habitat. Following the Conservation measures are points-of-contact for Washington State, additional educational resources about the Oregon spotted frog, and two appendices meant to provide you with information to support the conservation measures.

Please feel free to reach out to state and federal biologists if you have any questions. Your state and federal dollars are used to ensure that we are there to help you…and we are a friendly and frog savvy group. Finally thank you for the work you do with the community landowners and farmers to ensure that we conserve our natural resources.

CONSERVATION MEASURES

- Do not design dense planting of trees or shrubs in Oregon spotted frog habitat
- Maintain or enhance aquatic connectivity between seasonally flooded areas and permanent water sources.
- If possible design projects to maintain water in seasonally flooded area for the longest duration possible.
- Be cautious in designing project elements that may manipulate water flow and retention (culverts, roads, drainage and irrigation structures, water control structures, beaver management, etc).
- If possible avoid the use of herbicides and pesticides.
- Encourage management that maintains a short herbaceous vegetation community in seasonally flooded areas (mowing, haying, and grazing).
- Avoid in-water mechanical work.
- Where appropriate consider thinning dense areas of shrubs, trees, or reed canarygrass to create open-water wetland habitat.
- Avoid placing structures or infrastructure in seasonally flooded areas or near permanent water.
- Determine if the property is subject to maintenance management by an irrigation, drainage, or watershed improvement district and incorporate that into project design if possible
- Determine if the property owner is open to an amphibian survey by a state, federal or other trained biologist.
- Consider personal disinfection protocols to avoid spreading invasive species and disease.

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POINTS OF CONTACT

Washington Department of Fish and Wildlife

Thurston County - Black River Watershed
Michelle Tirhi: michelle.tirhi@dfw.wa.gov 206-406-9966 cell, 253-589-7012 office
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Whatcom County - Samish, South Fork Nooksack, and Sumas River watersheds
Robert Waddell: Robert.Waddell@dfw.wa.gov, (360) 466-4345 ext. 280

Skamania and Klickitat Counties – Trout Lake Creek and Glenwood Valley
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RESOURCES

There are a number of available online resources to learn more about the Washington State Endangered and Federally Threatened Oregon spotted frog listed below. Additionally two technical documents for assessing when and how to evaluate sites and planning measures for the Oregon spotted frog have are included as appendices to this document.

Online Resources:

- https://vimeo.com/278211745
- https://whatfrogs.wordpress.com/oregon-spotted-frog-rana-pretiosa/
- https://whatfrogs.wordpress.com/oregon-spotted-frog-monitoring-and-research-project/
- https://www.preciousfrog.ca/
- https://wdfw.wa.gov/conservation/endangered/species/oregon_spotted_frog.pdf
- (WDFW Draft Recovery Plan) https://wdfw.wa.gov/publications/01505/
- https://www.fws.gov/wafwo/articles.cfm?id=149489589
- (Critical habitat) https://www.fws.gov/southeast/endangered-species-act/critical-habitat/#for-private-landowners-and-citizens-section or https://www.fws.gov/endangered/what-we-do/critical-habitats.html

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Appendix I: Guidelines for Conserving Habitat for Oregon Spotted Frogs (*Rana pretiosa*)

Introduction

Oregon spotted frogs are native to the Pacific Northwest and their scientific name – *Rana pretiosa* – means "precious frog." Their range used to extend from northeastern California through western Oregon and Washington and into southwestern British Columbia. However, they are believed to be gone from California and found in greatly reduced areas in BC, WA, and OR. Habitat changes and loss are the biggest reason for the decline, particularly the loss of habitat required for successful breeding. Oregon spotted frogs are listed as threatened under the Endangered Species Act, considered a Species of Conservation Concern in Oregon, and Endangered in Washington.

Much of the existing range of the Oregon spotted frog occurs on private land or in areas where active management is occurring for other reasons, such as for agricultural uses and salmonid habitat restoration. These other restoration actions can have unintended consequences for the habitat of Oregon spotted frogs, providing an opportunity to collaborate on habitat conservation efforts.

The following is intended as guidelines to inform habitat restoration and management actions within the known and potential range of the Oregon spotted frog. Information is included on species identification, life history, range, and known threats. Detailed recommendations are provided on ways to manage habitat to provide adequate breeding habitat and to reconcile needs of Oregon spotted frogs with restoration actions intended for other purposes.

IDENTIFICATION AND NATURAL HISTORY

What is an Oregon Spotted Frog?

Oregon spotted frogs are **medium-sized** frogs (3-4 inches long) with **large, jagged black spots** with **light centers**. [1] Their coloration can be quite variable, ranging from **brown to red**. Their **yellow-green eyes** are distinctly **upturned**. They have **ridges** (called dorsolateral folds) that run along each side of the back and are indistinct in the hip area.[2]

Adult Oregon spotted frog

Juvenile Oregon spotted frog

[1] McAllister and Leonard 1997
[2] Jones et al. 2005, Pearl et al. 2010

Life Cycle

Oregon spotted frogs **breed in late winter and early spring**, about February to March at low elevations and March to June at higher elevations. Tadpoles hatch after two to four weeks and spend about four months growing and developing.[1] Tadpoles **transform into frogs** (aka metamorphosis) in **mid-to-late summer** and **remain in aquatic habitat year-round**, moving into permanent water as shallow breeding habitat dries. Oregon spotted frogs will remain **active throughout the winter**, even under ice in frozen ponds or streams.

Egg Masses

During breeding season, egg masses are the life stage most likely to be encountered in the field. Each female lays a globular egg mass about the **size of a grapefruit**, which contains 400-700 eggs. Egg masses are **unattached to vegetation** and are usually laid in **very shallow water** (6 inches or less) in areas with **full sun exposure**. Females typically, but not always, cluster their egg masses together (adjacent to and on top of each other). **Communal clusters** can be made up of anywhere from two egg masses to more than 100 egg masses.[2]

Mating pair of Oregon spotted frogs near a cluster of egg masses. Note the egg masses are at the very surface of the water, with some eggs above the surface.

A communal cluster of egg masses in very shallow water, on top of reed canarygrass

Distinguishing Between Similar Species

Oregon spotted frog eggs, juveniles, and adults can be difficult to distinguish from **northern red-legged frogs** (*Rana aurora*) and **Cascades frogs** (*Rana cascadae*). Appendix A provides a table with distinguishing characteristics between these species as well as the non-native American bullfrog (*Lithobates catesbeianus*). Appendix B provides a photographic comparison of the egg masses of Oregon spotted, northern red-legged, and Cascades frogs. Refer to the *Frogs…Red-Legged, Spotted & Cascades* brochure from the Washington Department of Fish and Wildlife for photographic comparisons between adult frogs of the three species. For any potential Oregon spotted frog site, it is important to confirm the species identity. Please take photographs and submit to local experts following the guidelines in Appendix D.

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Where are Oregon spotted frogs found?

See Appendix C for a map of current range. In **Washington**, Oregon spotted frogs are found at **low elevations** (40-620m) in Whatcom, Skagit, Thurston, and Klickitat counties.[3] They are known to occupy **six drainages**: Sumas River, lower South Fork Nooksack River, Samish River, Black River, Outlet Creek (Conboy Lake), and Trout Lake Creek. Recently they have also been found in an isolated wetland in Pierce County.

What threats do Oregon spotted frogs face?

The biggest threat to Oregon Spotted Frogs is **habitat change**, particularly wetland conversion to other land uses, hydrological changes through manmade structures or water control, increased sedimentation, changes in water quality and temperature, and loss of egg-laying habitat.[4]

Oregon spotted frogs require short, herbaceous vegetation in a shallow wetland with an open canopy for successful breeding. The widespread and continuing loss of this habitat is a significant threat to the species. Widespread reed canarygrass (*Phalaris arundinacea*), particularly in western Washington, changes wetland structure by creating dense mats of vegetation that is unsuitable habitat for Oregon spotted frogs, unless managed to mimic habitat.[5] At high elevation sites in Oregon, reed canarygrass is an issue in some areas but the bigger threat to habitat is **lodgepole pine and woody vegetation encroachment**.[6]

Non-native predatory animal species also pose a significant threat, through **predation and competition** on multiple life stages. Oregon spotted frogs prefer warm water habitats and remain in aquatic habitat year-round, exposing them to **non-native warm water fish** species that prey upon tadpoles. **Non-native bullfrogs** also negatively affect Oregon spotted frogs, preying upon juvenile and adult frogs and competing for habitat.[7]

In addition to these threats, Oregon spotted frog populations are generally small and isolated with low genetic diversity, increasing their vulnerability to random events such as drought or flood that could eliminate individual populations.[8]

HABITAT CONSERVATION

What habitats do Oregon spotted frogs need?

Oregon spotted frogs need an extensive wetland complex that contains vegetation of varying densities along edges and in pools. Specifically, this habitat should contain:

1. **Shallow** (30 cm or less)**, still water, with full sun exposure, and inundated for at least four months** for egg development and tadpole survival. Short herbaceous vegetation is required, either early successional, grazed, hayed, mowed, or longer vegetation compressed by winter snow pack.

[3] Jones et al. 2005
[4] Dahl 1990, McAllister and Leonard 1997
[5] McAllister and Leonard 1997
[6] Pearl 1999
[7] Nussbaum et al. 1983, Pearl et al. 2009
[8] Lande 1988, Funk et al. 2008, Blouin et al. 2010

2. **Perennial water with emergent vegetation** (still or lightly flowing water) for protecting juveniles and adults during both the dry season and cold wet weather. These can include pools, springs, ponds, lakes, streams, canals, or ditches. To serve as overwinter sites, it should remain inundated with water from October to March. Known overwintering sites contain flowing water.

3. **Aquatic connectivity** between these habitats. Without connectivity tadpoles may be stranded in water that dries before they complete metamorphosis and adults may have difficulty navigating to suitable breeding habitat. [9] Aquatic corridors should be free of barriers such as dams, abundant predators, or lack of refugia from predators.

4. **Refugia** habitat within any of the above habitat types that provide refuge from predators, which includes areas of dense vegetation or downed wood.

5. **Absence of non-native predators**, i.e., non-native warm water fish and non-native bullfrogs.

The table below lists the different habitat needs for the various life stage of the Oregon spotted frog, along with approximate time of year the habitat is needed.

Life Stage	**Approximate Timing**	**Habitat Needs**
Mating and egg laying (oviposition)	*Low elevation* (western Washington): Feb to early April *Mid-elevation* (Trout Lake and Conboy Lake, WA):late Feb to early April *High elevation* (Oregon): late March to early June	• Shallow, still water with full sun exposure and/or short canopy cover • Aquatic connectivity to permanent water (still or lightly flowing water). In Washington, a gradual topographic gradient is necessary (3% or less)[10]; in Oregon, a steeper gradient is normal (around 5 to 10%).[11] Concerns: adult ability to access breeding habitat from overwintering habitat
Egg development	Eggs hatch in 2-4 weeks *Low elevation* (western Washington): late Feb to early May *Mid-elevation* (Trout Lake and Conboy Lake, WA):early March to early May *High elevation* (Oregon): early April to early July	• Shallow, still water with full sun exposure and/or short canopy cover Concerns: eggs at risk of drying out or freeze damage if water recedes too quickly

[9] Watson et al. 2003, Pearl and Hayes 2004
[10] Watson et al. 2003
[11] Pearl et al. 2009

Life Stage	Approximate Timing	Habitat Needs
Tadpole development	*Low elevation* (western Washington): March to July *Mid-elevation* (Trout Lake and Conboy Lake, WA): April to July *High elevation* (Oregon): April to Aug (to early Sept at highest elevations)	• Shallow, still water with full sun exposure and/or short canopy cover • If water is ephemeral, needs to be connected with surface water flow to permanent water. In Washington, a gradual topographic gradient is necessary (3% or less)[10]; in Oregon, a steeper gradient is normal (around 5 to 10%).[11] • Refugia from predators (areas with dense vegetation or downed wood) Concerns: ability of tadpoles to move to deeper/permanent water as shallower water dries or recedes
Juvenile and adult development and survival	*Year round*	• Perennial, deep, moderately-vegetated pools (still or lightly flowing water) • Connectivity between shallow and deeper water. In Washington, a gradual topographic gradient is necessary (3% or less)[10]; in Oregon, a steeper gradient is normal (around 5 to 10%).[11] • Refugia from predators (areas with dense vegetation or downed wood) Concerns: exposure to non-native fish and bullfrogs
Overwintering	*Low elevation* (western Washington): Sept to Jan (wet season) *Mid-elevation* (Trout Lake and Conboy Lake, WA):Sept to Feb (wet season) *High elevation* (Oregon): mid-Sept to March (wet season)	• Perennial water with emergent vegetation. Known overwintering sites contain flowing water. • Refugia from predators (areas with dense vegetation or downed wood), freezing conditions, and low oxygen conditions Concerns: exposure to lethal winter conditions (freezing, low/no oxygen, and predation)

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Example of shallow breeding habitat with short emergent vegetation (in this case through annual mowing of reed canarygrass).

A female Oregon spotted frog carrying a male over land to breeding habitat where aquatic connectivity has been lost or diminished, leaving this highly aquatic frog more vulnerable to predation.

<u>What are ways to maintain habitat for Oregon spotted frogs?</u>

1. Manage vegetation to maintain breeding habitat and access.
    - Maintain **short emergent (herbaceous) vegetation** in shallow water containing open areas with full sun exposure.
    - Avoid planting trees or shrubs near wetlands or other Oregon spotted frog breeding habitat that will eventually shade the water.
    - If plantings are necessary, choose shrubs rather than trees and plant in clusters that will not shade the shallow areas or choose vegetation that dies back in the winter, thus is short during egg-laying to hatching..
2. Maintain **aquatic connectivity** between shallow breeding habitat and deeper permanent water. Breeding habitat is still water (lentic) while permanent water can be still or lightly flowing (lotic).
    - When water control is possible, maintain shallow water in breeding areas from winter through metamorphosis (late summer).
    - Maintain **gradual slope** between seasonal shallow water habitats and permanent water so tadpoles and juveniles can follow receding water to areas that maintain water year round.

Reed Canarygrass Management Options

For most of the known Oregon spotted frog sites in Washington, reed canarygrass is abundant and requires manipulation to maintain breeding habitat and prevent further decline and loss of existing Oregon spotted frog populations. While restoration to native wetland communities is ideal, it requires much more effort (and usually higher costs). If that level of effort is not possible, other options can be undertaken on an annual basis.

Short Term / Annual Options

In some circumstances, livestock grazing can benefit Oregon spotted frogs by keeping reed canarygrass short and maintaining open water areas that can be accessed for breeding.[5] In absence of grazing, annual

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mowing of reed canarygrass can maintain breeding habitat.[12] The Natural Resources Conservation Service (NRCS) can provide technical guidance on developing a site-specific grazing management plan that can maintain Oregon spotted frog habitat, meet livestock producer needs, and maintain water quality.

All activities should occur only when soils are firm enough to sustain equipment or livestock traffic without causing excessive soil damage or erosion through compaction or surface rutting. Typically, the soil water table should have dropped to at least 12 inches below the soil surface before traffic occurs. This usually will not occur before the end of April. Because of soil moisture gradients, management activities may need to occur in bands around the surface water area throughout the season, starting at the upper part of the slope where soils should dry out first.

Initial Management

If the area has not been harvested for several seasons and there is overmature grass with heavy thatch present, then mowing should be done before the initial grazing or hay harvest. Ideally, this will occur in late summer or fall (outside the primary mating and tadpole development seasons) the year before the haying or grazing management system begins. Ideally, the mowed decadent grass and thatch should be removed from the field (potentially by baling or burning). If that isn't practical, then the dead material should be chopped into short lengths with equipment such as a brush-hog mower. Mowing height should leave 3-6 inches of residual stubble.

Managed Grazing

Install needed infrastructure for grazing management, such as fences and livestock watering facilities. If livestock can be controlled with a power fence, it is a very effective tool to control location and intensity of grazing because temporary wires can easily cross-fence a pasture into small units.

In the spring, initiate grazing when soil conditions are dry enough to support traffic without excessive soil damage, per the guidance above. Establish grazing paddocks of a size to provide 1-2 days of grazing for the herd. Move the livestock to the next paddock when the target stubble height is reached (generally 3-6 inches for reed canarygrass when being managed for frog habitat). Continue the livestock rotation around the paddocks, adding downslope paddocks to the rotation as the field dries out through the spring and summer. Continue to rotate livestock through the paddocks, observing the target stubble height, until either the fall rains make the field too wet to graze without soil damage, or plant growth slows enough that other forage sources are needed.

Conserved Forage Grass Management (hay, haylage, silage, etc.)

Harvest the forage as soon in the season as soil and weather conditions allow (typically late May to early July). The site needs to be dry, without pockets of water. This will also minimize chance for impacting adult frogs at the site. Mowing height should leave 3-6 inches of residual stubble. Remove the forage from the field as soon as possible. Harvest again when reed canarygrass height reaches 18 inches. Harvest for the final time in mid-to-late September. If there is not enough forage to make it worthwhile to bale hay or make silage, the field should still be mowed with the material chopped into short lengths and left in place.

[12] (Kapust et al. 2012)

If no livestock grazing or conserved forage harvest occurs in a given year, then at a minimum, mowing should occur as outlined in "Initial Management" above.

Water Quality Concerns

If the managed grazing guidelines for soil moisture, stubble height, and paddock rotation are followed, then water quality issues should be minimized because the livestock will run out of forage before they can deposit excessive manure. Surface water will not be in the immediate vicinity of grazing animals since grazing should only occur after soils are firm enough to support the livestock. Rotation of livestock between paddocks will also minimize water quality issues. In addition, grass filter strips are an effective method for dealing with sediment issues, and a reed canarygrass field can be considered a grass filter strip that is managed with livestock.[13]

Longer Term Options

In the long run, it would be preferable to restore habitat to short emergent native plant species and create habitat that does not require annual maintenance (i.e., early successional habitat). The following options will likely have the greatest benefit for Oregon spotted frogs.

Install Vegetation Barrier Cloths

Using vegetation barrier cloths is an option to control reed canarygrass and provide Oregon spotted frog breeding habitat. These methods are still being tested and refined, but barrier cloth has the potential to provide several years of reed canarygrass control (versus annual mowing) and to restore native vegetation communities.[14] It is important to consult with Oregon spotted frog experts who can provide guidance on the best way to use vegetation barrier cloths at a particular site.

Important considerations:

1. The key is to place the barrier cloth in a patchy mosaic (rather than a single large swath). Oregon spotted frogs will lay eggs on the edges of the cloth, but are unlikely to cross a large covered area and are more susceptible to predators in the middle of the cloth patches.
2. Vegetation should be maintained between patches of barrier cloth, ideally at a short height to allow connectivity to ensure frogs and tadpoles are able to move throughout the water unhindered.
3. Install barrier cloth only when site is completely dry.
4. Barrier cloths should ideally be placed perpendicular to water sources, to facilitate movement of frogs and tadpoles from shallower breeding habitat to deeper permanent water.

Methods:

1. Mow reed canarygrass to a short height (3-4 inches).
2. Install barrier cloths using stakes to secure the cloths to the ground.
3. Barrier cloth should remain on the ground long enough to kill the reed canarygrass below. In mid elevations in Washington (Trout Lake, Conboy Lake areas), one year may suffice. In cooler climates (western Washington or Oregon Cascades), this may require two years or more.

[13] Hudson 2008
[14] Tu 2004

4. Barrier cloths will require occasional checks to ensure it does not need re-staking. It is possible some sediment will settle on top of the cloth and native plants may begin to grow. Other wildlife, such as elk, may also disturb the cloth through trampling, requiring additional maintenance.
5. Once the cloths are removed, native plant species should be planted, focusing on short emergent wetland species. If any reed canarygrass sprouts after cloth removal, it will require hand weeding or herbicide treatment (use only in areas that dry completely during the summer).

Maintain Beavers

Historically, Oregon spotted frogs are thought to have benefitted from habitat maintained through the actions of American beavers (*Castor canadensis*). Beavers create and maintain a mosaic of aquatic habitats needed by Oregon Spotted Frogs throughout the year. Beaver-maintained ponds provide deep water that is important for summer foraging and growth of newly-metamorphosed frogs and for over-wintering. Abandoned pools become shallow wetlands that provide suitable habitat for breeding and laying eggs. Maintaining flooded areas also helps control reed canarygrass, since reed canarygrass cannot survive a constant flooded environment. Maintaining beavers also helps maintain natural disturbance regimes and ecological communities.[15]

Mow and herbicide

Herbicides should be used only under very limited circumstances. Because of the lack of specific information on herbicide effects to Oregon spotted frogs,[16] herbicides should not be used where eggs, tadpoles, or frogs will be exposed. In areas where the breeding habitat dries completely and does not refill with water before the herbicide has broken down, an aquatically approved herbicide will likely not pose a direct lethal risk to Oregon spotted frogs. Because of the uncertainties surrounding herbicides and Oregon spotted frogs, a non-herbicide method is preferred.

Salmon Restoration and Oregon Spotted Frog Habitat Conservation

In areas within the Oregon spotted frog's occupied range, consider how habitat conservation actions targeted toward salmonids might affect Oregon spotted frogs and their habitat. Salmonids and Oregon spotted frogs are both in decline throughout their respective ranges, and every effort should be made to address both species concerns. To facilitate those efforts, the table below provides a guide to restoration actions that accomplish salmonid habitat restoration goals that minimize effects (or even benefit) Oregon spotted frog habitat.

[15] Shovlain 2005, Cushman and Pearl 2007
[16] Yahnke et al. 2013

Goal: Control erosion by stream banks	
Preferred Action	Actions to Avoid or Minimize
Plant short emergent (herbaceous) vegetation If shrubs are necessary, plant in clusters, leaving areas open with short emergent vegetation.	Planting trees that will shade the nearby floodplain
Goal: Improve water quality	
Preferred Action	Actions to Avoid or Minimize
Plant filter strips using short herbaceous vegetation Manage grazing according to guidelines above, following guidelines for soil moisture, stubble height, and paddock rotation.	Planting woody vegetation in shallow breeding water habitat for Oregon spotted frogs
Goal: Provide cold water habitat for salmonids	
Preferred Action	Actions to Avoid or Minimize
Manage streams in sections, with some sections deep and shaded and other sections shallower and flooded. Maintain connectivity between shallower sections and deeper margins of the streams. For plantings, focus on shrubs rather than trees, planting them in clusters	Dense plantings that will extensively shade floodplains and wetlands

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Examples of habitat restoration actions with unintended consequences for Oregon spotted frogs:

Planting trees in a wetland will eventually shade the water and make the habitat unsuitable as Oregon spotted frog breeding habitat.

Removing grazing from an area can allow reed canarygrass to grow densely, crowding out habitat for Oregon spotted frogs.

Habitat concerns in the Cascades in Oregon:

While less widespread in the Oregon Cascades, reed canarygrass is still an issue for Oregon spotted frog habitat.

A major habitat concern in the Cascades in Oregon is encroachment by lodgepole pine and other woody vegetation into early successional habitat (i.e., shallow wetland areas).

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Appendix A – Identification Guide for Oregon Spotted Frogs and Similar Species

Table modified from Pearl et al. (2010). Information compiled from Jones et al. (2010), Leonard et al. (1990), Corkran and Thoms (2006).

	Oregon spotted frog (*Rana pretiosa*)	**Northern red-legged frog (*Rana aurora*)**	**Cascades frog (*Rana cascadae*)**	**Bullfrog (non-native) (*Lithobates catesbeianus*)**
EGGS				
OVERALL NOTES	Due to high similarity, Oregon spotted frog egg masses cannot be distinguished with certainty from Cascades frog egg masses in areas of range overlap.	Some egg masses cannot be distinguished with certainty from Oregon spotted frogs (when not attached to vegetation).	Due to high similarity, Cascades frog egg masses cannot be distinguished with certainty from Oregon spotted frog egg masses in areas of range overlap.	Of these 4 species, bullfrog is the only summer breeder (generally June-Aug). No overlap in bullfrog egg masses and these species is expected.
Egg mass size	• Orange to grapefruit sized mass • Individual eggs small when initially laid, expand as absorb water • Mass contains 400-700 eggs	• Orange to cantaloupe sized mass • Individual eggs small when initially laid, expand as absorb water • Mass contains 750-2,000 eggs	• Usually slightly smaller than Oregon spotted frog egg mass, baseball to orange sized • Individual eggs small when initially laid, expand as absorb water • Mass contains 300-500 eggs	• Laid in large sheet of jelly • One female can produce 4,000-40,000+ eggs
Egg mass aggregation	• Egg masses often laid in clusters, from 2 to 100+ masses together • Single egg masses also common (particularly in WA at Trout Lake and Conboy Lake)	• No (usually spaced apart)	• Egg masses often laid in clusters	• No (usually spaced apart)
Egg mass position	• Typically laid above previous year's vegetation • Laid in very shallow water, typically 15 to 30 cm deep; often protruding above water surface • When in clusters, laid on top or next to one another	• Egg masses attached to vegetation • Usually laid deeper than Oregon spotted frog eggs, typically in water > 30cm deep	• Typically laid above previous year's vegetation • Laid in shallow water, often protruding above water surface • When in clusters, laid on top or next to one another	• Laid at water surface, often draped over vegetation
Egg mass appearance before hatching	Spreads out and looks foamy. Egg masses below surface may float up to surface.	As development proceeds, the egg masses often detach from vegetation and float to the surface where they spread out and appear foamy.	Can spread out and appear foamy	Can become foamy as it disintegrates; can mix in with algae and sink below surface as it develops

	Oregon spotted frog (*Rana pretiosa*)	Northern red-legged frog (*Rana aurora*)	Cascades frog (*Rana cascadae*)	Bullfrog (non-native) (*Lithobates catesbeianus*)
ADULTS				
Eyes	• Bright yellow-green (chartreuse) • Oriented distinctly upwards	• Brownish-gold • Oriented to side	• Gold • Oriented to side	• Gold • Oriented moderately upward
Dorsolateral folds (ridges on back)	Indistinct on lower back	Distinct along entire back	Distinct along entire back	Absent but has a short ridge behind eye and around the eardrum (tympanum)
Back / spots	• Background color brown to red • Sizeable black spots with irregular edges, usually with light bump in the center • Skin appears bumpy	• Background color tan to brown • Rarely with red hue • Black speckling, irregular marks, or no marks • Skin generally smooth	• Background color tan to brown • Round or angular black spots with crisp edges sometimes with light center • May have no spots • Skin can appear bumpy (like Oregon spotted frog)	• Background color usually green or brownish • Color can be solid or contain brown-black spots or marbling
Lip line	Can be distinct or blurred on snout	Light lip line extends almost to shoulder. Can be less distinct on snout	Yellow lip line extends almost to shoulder	Bright green upper lip with indistinct edges
Underside of thigh color	Opaque with a red or orange surface color	Most of hind leg is usually translucent red	Yellow to tan	Usually white, sometimes with grey mottles
Dark mask behind eye	Absent, pale, or patchy	Variable, sometimes distinct	Distinct	None
Underside color	Mottled red, orange or gray on belly	Red or orange	White or yellow, throat mottled	Whitish with large gray mottling; male throat is yellow

Oregon spotted frog features (adult)

Appendix B – Comparison of egg masses

	Oregon spotted frog	**Northern red-legged frog**	**Cascades frog**
Individual egg masses	Freshly laid egg mass at the surface of the water. The eggs will absorb more water and expand. Oregon spotted frog egg masses are not always at the surface of the water, but will not be attached to vegetation.	Eggs tend to be laid deeper than Oregon spotted frog eggs and are attached to vegetation.	Individual Cascades egg masses cannot be distinguished from Oregon spotted frog eggs in areas where the species overlap.

		As the egg masses age and develop, they spread out, can appear foamy, and even float to the surface of the water. 	
Communal egg masses	Oregon spotted frogs lay egg masses directly on top of and adjacent to each other. 	It is possible for red-legged frog egg masses to be laid near each other, but the egg masses are not communally laid. Egg mass attachment to vegetation will distinguish red-legged frog eggs from other species. 	Cascades frog communal egg cluster cannot be distinguished from Oregon spotted frogs in areas where the species overlap.

Appendix C – Photo Vouchers to Confirm Species Identification

If a local expert is unable to visit a site and confirm species identification, photos must be taken and submitted to the Washington Department of Fish and Wildlife, Oregon Department of Fish and Wildlife, or the U.S. Fish and Wildlife Service.

Egg masses are most likely to be observed in the field during breeding season (~ Feb to April). If encountered, take several photos that can show:

1. Habitat where egg masses were observed
2. Number and size of egg masses
3. Water depth
4. Whether egg mass(es) are attached to vegetation

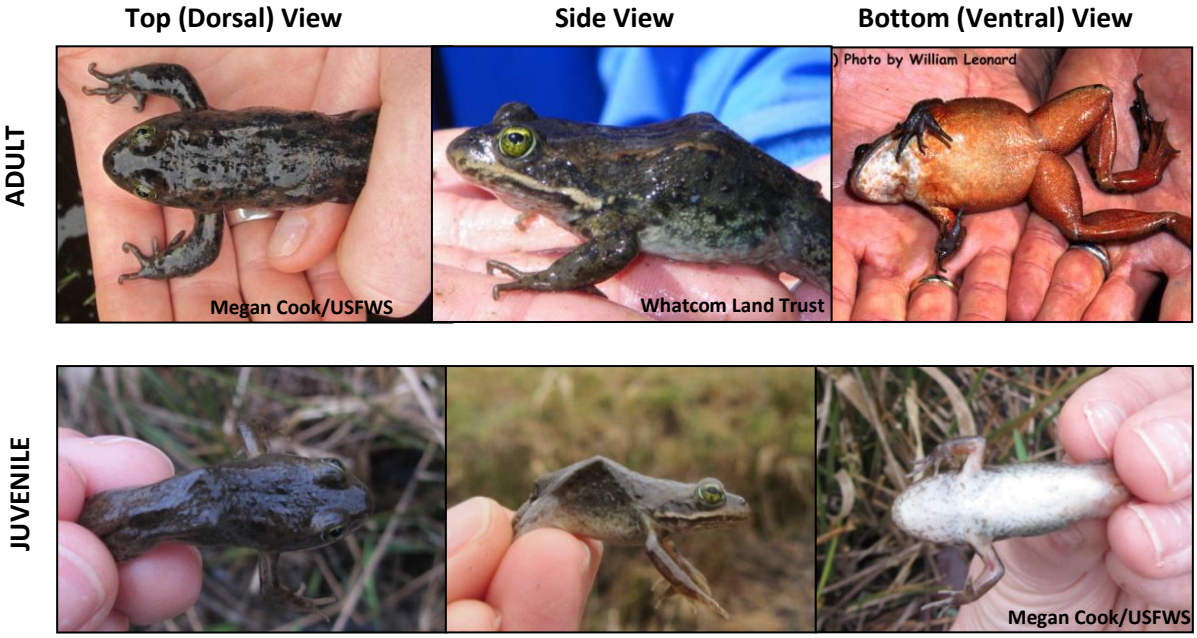
Egg masses may not be sufficient to confirm species. If there are **juvenile or adult frogs** present, try to catch and take photos (adults preferable to juveniles). Take several photos that show:

1. Top (dorsal) view
2. Bottom (ventral) view
3. Side view, preferably with legs extended to show the groin area

When handling juvenile and adult frogs, follow these guidelines:

1. Make sure hands are completely clean of any lotions or sunscreens
2. Hold frog between groin and leg joint
3. Do not let the frog dry out (can dip back in water if needed)
4. Take photos as quickly as possible

Photo Voucher Examples



To confirm species identification, send photos to:

Washington Department of Fish and Wildlife

Name	Area	Email
Lisa Hallock	Statewide	Lisa.Hallock@dfw.wa.gov
Marc Hayes	Statewide	Marc.Hayes@dfw.wa.gov
Robert Waddell	Whatcom, Skagit Counties	Robert.Waddell@dfw.wa.gov
Christopher Anderson	King, Snohomish Counties	Christopher.Anderson@dfw.wa.gov
Michelle Tirhi	Thurston, Pierce, Lewis Counties	Michelle.Tirhi@dfw.wa.gov
Stefanie Bergh	Skamania, Klickitat Counties	Stefanie.Bergh@dfw.wa.gov

U.S. Fish and Wildlife Service

Name	Area	Email
Shirley Burgdorf	Washington	Shirley_Burgdorf@fws.gov
Teal Waterstrat	Washington	Teal_Waterstrat@fws.gov

APPENDIX II: IS FEDERALLY THREATENED OREGON SPOTTED FROG OR ITS CRITICAL HABITAT IN YOUR WASHINGTON STATE PROJECT AREA?

There are several great resources to learn about the Oregon spotted frog's federal and Washington State status on line:

- To learn about the **federal** status of frogs please visit the Environmental Conservation Online System (ECOS) page for the Oregon spotted frog: http://ecos.fws.gov/tess_public/profile/speciesProfile?spcode=D02A

For the Listing Rule see: https://www.gpo.gov/fdsys/pkg/FR-2014-08-29/pdf/2014-20059.pdf

For the Proposed Critical Habitat Rule see: https://www.gpo.gov/fdsys/pkg/FR-2013-08-29/pdf/2013-20985.pdf

- To learn more about what **federal** trust resources and species that may occur within the action area[17] or footprint of your project please visit our Information for Planning and Conservation (IPAC) site and follow the step by step instructions to develop a species list: https://ecos.fws.gov/ipac/

- To learn about the Washington State status of the Oregon spotted frog please visit the Washington department of Fish and Wildlife (WDFW) "species of concern" page (http://wdfw.wa.gov/conservation/endangered/) or the WDFW Priority Habitats and Species (PHS) portal (http:/wdfw.wa.gov/conservation/phs/).

- If your IPAC resource list includes the Oregon spotted frog it is likely that you are in a watershed or drainage that supports or may have the potential to support an Oregon spotted frog population (Fig 1). Projects that cause change to aquatic habitat, ground water, seasonal or permanent waters or even include slight modifications (such as improving fish passage or run off from herbicide, grazing in seasonal wetlands, etc.) may have potential impacts to Oregon spotted frog.

If your IPAC resource list includes the Oregon spotted frog it is likely that you are in a watershed or drainage that supports, or may have the potential to support, an Oregon spotted frog population (Figure 1).

If the IPAC resource list includes Critical Habitat for the Oregon Spotted frog then you should consider what, if any, impacts your project will have to the Primary Constituent Elements of Oregon spotted frog Critical Habitat (78 FR 53543 -53544, Appendix 1)

Projects that fall outside of this area will likely not affect the Oregon spotted frog. If you still have concerns please review the habitat screen tool and habitat assessment tool that follow.

[17] Action area is defined as all areas that may be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action. It encompasses the geographic extent of environmental changes (i.e., the physical, chemical and biotic effects) that will result directly and indirectly from the action. Action area is typically larger than the area directly affected by of the action.

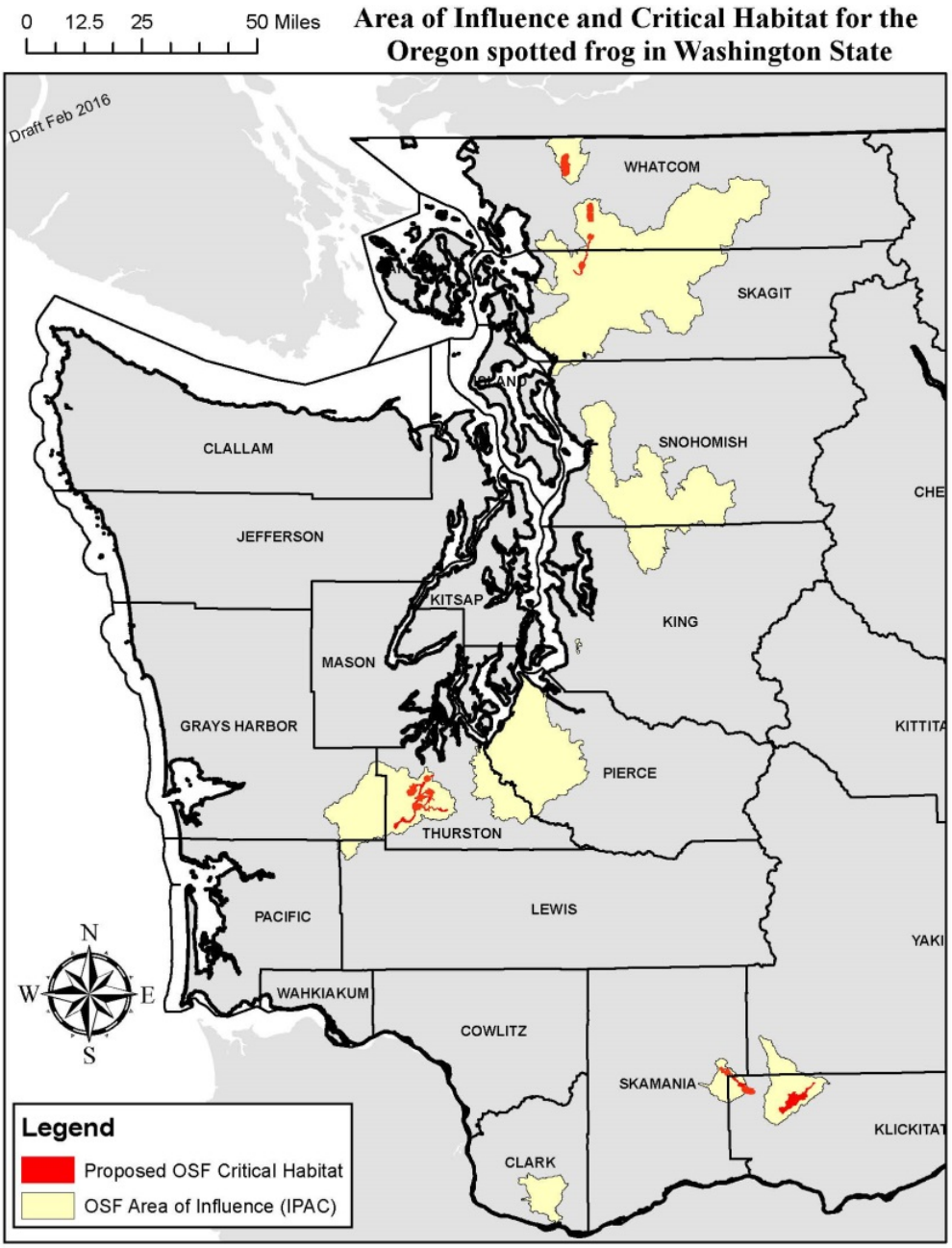


Figure 1: Critical habitat and Area of influence that are currently used to determine if the Oregon Spotted frog will occur on a projects federal resource list[18].

[18] Is the project in one of the following watersheds? (These are mapped as USGS HUCs (10 and/or 12) in the with the exception of the Green River in Kent, which is only part of a HUC – see Figure 1.) Baker River, Black River-Chehalis River, Chambers Creek-Frontal Puget Sound, Chapman Creek, Finney Creek- Skagit River, Fraiser Creek, Green River Kent, Lacamas Creek, Lower Nisqually River- Frontal Puget Sound, Lower Snoqualmie River, Lower Trout Lake Creek, Outlet Creek, Quilceda Creek-Frontal Possession Sound, Samish River, Skagit River-Frontal Skagit Bay, South Fork Nooksack River, Sumas River, Wallace River-Skykomish River, and the Woods Creek-Skykomish River.

There is non-OSF habitat with in the identified sub-basins and watersheds[2]. Oregon spotted frog habitat can be broadly defined in 2 categories: 1) breeding and oviposition habitat and 2) non-breeding habitat. Breeding habitat is characterized as shallow water emergent (sedge, rush, and grass vegetation) wetlands which are relatively unshaded and that typically have an aquatic connection to perennial waters. The extent of this habitat can vary inter and intra-annually with fluctuating water levels. Non-breeding habitat can include characteristics of breeding habitat but also includes slow moving deeper and shaded waters with floating and submerged vegetation. This can include springs, ponds, lakes, sluggish streams or rivers, irrigation canals, shrub wells (depressions around shrubs or small trees that can retain water or moisture throughout the year), or roadside ditches. If the entire impact area for the project is in a shaded conifer dominated riparian area, has primarily coarse inorganic substrates (gravel, cobble, etc.), and has swiftly flowing waters, it is not a habitat type typically used by the Oregon spotted frog. A more detailed description of how to determine Oregon spotted frog habitat can be found in Appendices 2 and 3.

If your project does appear on the IPAC resource list there are still several things to consider before entering into consultation or for an ESA permit if needed. Will you be working directly or adjacent to Oregon spotted frog habitat? Will you project be changing the hydrology, water quality, vegetation, or species composition of Oregon spotted frog habitat even if you are not working in or nearby? If so then you should probably consider getting in contact with your local USFWS field office (360-753-9440).

If you encounter a live or dead Oregon spotted frog of any life stage please contact WDFW or USFWS staff as identified in the OSF Habitat Conservation guidelines or call 360-753-9440. If possible please take pictures.

APPENDIX 1: PRIMARY CONSTITUENT ELEMENTS FOR THE 08/29/2013 CRITICAL HABITAT FOR THE OREGON SPOTTED FROG; PROPOSED RULE

Primary constituent element 1— Nonbreeding (N), Breeding (B), Rearing (R), and Overwintering Habitat (O). Ephemeral or permanent bodies of fresh water, including, but not limited to natural or manmade ponds, springs, lakes, slow-moving streams, or pools within or oxbows adjacent to streams, canals, and ditches, that have one or more of the following characteristics: • Inundated for a minimum of 4 months per year (B, R) (timing varies by elevation but may begin as early as February and last as long as September); • Inundated from October through March (O); • If ephemeral, areas are connected by surface water flow to a permanent water body (e.g., pools, springs, ponds, lakes, streams, canals, or ditches) (B, R); • Shallow water areas (less than or equal to 30 centimeters (12 inches), or water of this depth over vegetation in deeper water (B, R); • Total surface area with less than 50 percent vegetative cover (N); • Gradual topographic gradient (less than 3 percent slope) from shallow water toward deeper, permanent water (B, R); • Herbaceous wetland vegetation (i.e., emergent, submergent, and floating leaved aquatic plants), or vegetation that can structurally mimic emergent wetland vegetation through manipulation (B, R); • Shallow water areas with high solar exposure or low (short) canopy cover (B, R); • An absence or low density of nonnative predators (B, R, N)

Primary constituent element 2— Aquatic movement corridors. Ephemeral or permanent bodies of fresh water that have one or more of the following characteristics: • Less than or equal to 5 kilometers (3.1 miles) linear distance from breeding areas; • Impediment free (including, but not limited to, hard barriers such as dams, biological barriers such as abundant predators, or lack of refugia from predators).

Primary constituent element 3— Refugia habitat. Nonbreeding, breeding, rearing, or overwintering habitat or aquatic movement corridors with habitat characteristics (e.g., dense vegetation and/or an abundance of woody debris) that provide refugia from predators (e.g., nonnative fish or bullfrogs).

Appendix 2: Remote Oregon Spotted Frog Habitat Screening Model**.**

Use the following GIS layers/information or most current versions of the GIS layers to determine whether the action area may contain potentially suitable habitat for Oregon spotted frog. These layers can help to inform whether the Primary Constiuent Elements (PCEs) of critical habitat may be present; however if the action area is entirely or partially within critical habitat, a site visit may be required.

a. Evaluate the soils: Do the soils consist of loams (silt, clay, fine sandy gravelly, cobbly and stony), mucks (e.g. Semiahmoo, Mukilteo), Loamy sands, or other poorly drained fibisols, mesisols, organic cryosols, gleysols or umisols.

b. Evaluate project site elevation – For projects in the Lower Trout Lake Creek, Fraiser Creek, Outlet Creek and Chapman Creek HUCs, does the action area lie between sea level and 2,650 feet? For the all other OSF HUCs, does the action area lie between sea level and 1,100 feet in elevation?
c. Do any of the following types occur within the action area? (do not assess for OSF if the attributes are within marine, or brackish, or tidally influence bodies of water)

i. Washington Department of Ecology 2011 Modeled wetland layer/grid code attributes
• Grid Code 1, Class_Name Potentially Disturbed Wetlands
• Grid Code 2, Class_Name Palustrine Forested Wetland
• Grid Code 3, Class_Name Palustrine Scrub/Shrub Wetland
• Grid Code 4, Class_Name Palustrine Emergent Wetland
• Grid Code 9, Class_Name Water
• Grid Code 10 Class_Name Palustrine Aquatic Bed

ii. National Land Cover 2011
• Grid_code 81: Pasture/hay (May be an extension or overlap Potentially Disturbed Wetlands class in the DOE Wetland inventory)
• Grid_code 95: Herbaceous emergent wetlands
• Grid_code 90: Woody wetlands
• Grid_code 11: Open water

iii. National Hydrology Dataset 2011: This layer should be used as a tool to look for connectivity between permanent water and refugia/summer habitat.
• Waterways, including ditches, channels, canals, streams, and rivers. If the action area contains any of the features included in the above criteria (a-c) it should be considered potentially suitable for OSF presence.

During the site visit, screen the action area to determine the type of OSF habitat: breeding, summer or winter habitat that may be present. All three habitat types do not need to be present within the action area for the area to be considered suitable to support OSF. If you do not have right of entry to these areas, field screening may not be possible. In access limited scenarios, conduct a visual survey of the area to be best of the personnel's ability.

a. Evaluate the action area for breeding habitat
i. Contains low gradient shallows with extensive areas < 12 inches deep.

ii. Inundated for at least 5 weeks during late winter/early spring, starting as early as February.

iii. Dominated by (constituting > 50% of existing vegetative cover) emergent wetland vegetation. Ideal vegetation cover would be plants such as *Carex, Eleocharis, Juncus , Sparganuim, Spiraea, Potamogeton, Scirpus, Utricularia,* or *Ranunculus* species, filamentous algae, and native grasses, but which may also contain subdominant vegetation of other plant species having an upright submergent or emergent growth form. However, most OSF occupied areas are dominated by reed canarygrass (*Phalaris arundinacea*), therefore, do not discount this vegetation type as breeding habitat.

iv. Have > 10% plant coverage of bottom substrate, primarily in submergent and emergent growth forms. Reed canary-grass may be being managed to replicate short, emergent vegetation.

v. Have low surface and above-water canopy closure in the form of woody stemmed shrubs and trees, excepting the margins (within 50 ft of open expanses) of deciduous forest stands where leaf-out occurs after egg-laying, and,

vi. Remain connected to summer-season habitat by still or slow moving surface waters until post hatching in an average year. This period will be 5-8 weeks from the date of egg deposition, and will usually occur by June 30 in an average year.

Note that in some watersheds, occupied breeding habitat has been planted with trees and shrubs as wetland mitigation. These habitats may continue to be occupied but may not meet all of the criteria in this screen.

b. Evaluate the action area for suitable summer – season features.
i. Contains persistent (perennial) lentic pools, ditches, canals, or slow moving rivers, that:
• Have emergent, floating or submergent wetland vegetation growth forms. (Note they will use reed canary-grass dominated systems)
• May have Palustrine forested vegetation including *Spiraea, Salix* or *Alnus* species in shrub or tree form or upland shrub-tree form vegetation present and within a distance that provides at least partial shading.
• Are/become connected via suitable surface water to winter habitat during the fall.

c. Evaluate the site for Winter habitat.

i. Contains ponded, pooled or channeled areas of either lotic or lentic water that:
• Exceed 6” in depth.
• Have some combination of aquatic bed, emergent and scrub shrub vegetation present and intermixed with unconsolidated bottom habitat.
• Are not scoured (scoured = having flows capable of removing rooted vegetation or re-arranging distribution of large- grained sand and gravel substrates) by winter storm-related flows during an average year.)
• Inundated from at least October through March
• If site elevation is such that ice cap persists for > 1- 2 weeks during an average winter, then in channel flow or springs/ upwelling must be present.