

## Upper Deschutes Basin Model Watershed Whychus Creek Program Matrix

| <b>Whychus Creek Restoration Objective:</b>  |   |  |   |  |  |
|--|---|--|---|--|--|
| <ul style="list-style-type: none"> <li>▪ Restore stream habitat, flows, passage and water quality necessary to support applicable life history stages of steelhead, redband trout, bull trout and chinook salmon.</li> </ul> |   |  |   |  |  |
| <b>Stream Flow Restoration</b>   |   |  |   |  |  |
| <b>Measurable Restoration Objectives</b>   | <b>Hypothesis</b>   | <b>Interim Benchmarks</b>  | <b>Tasks and Timeframe</b>  | <b>Metrics</b>   | <b>Roles and Responsibilities</b>  |
| 1. By 2016: Restore 25 cfs of summer flow below river mile 23.5.<br>2. By 2016: Restore 20% of natural hydrograph.   | H <sup>1</sup> : Restoring 25 cfs of instream flow during summer low flow periods will enhance survival such that self-sustaining target species can establish and maintain population levels in Whychus Creek. | 1. By 2010: Document 15 cfs instream in August.<br>2. By 2016: Document 25 cfs instream in August. | <b>Strategies:</b><br>a) Water Marketing<br>b) Conservation<br>c) Acquisition<br><b>Monitoring &amp; Evaluation</b><br>1. 2006-2016: Establish and maintain stream flow monitoring system; maintain existing 4 gauges; add one gauge between Hwy 20 and Camp Polk Rd. (by May 2007)<br><b>Conservation</b><br>2. 2009: Complete McKenzie Canyon piping project (6 cfs water / 6 cfs paper rights).<br>3. 2008: Complete an additional piping project 0.5 cfs water right).<br><b>Water Marketing</b><br>4. 2007-2008: Three Sisters Irrigation District Surface to Ground water exchange (up to 15 cfs). DRC will coordinate with partners (UDWC, DBLT, ODFW, etc.) to evaluate project outcomes.<br>5. 2006-2008: Annual water | 1. 2006-2016: Permanent stream gages established and maintained at four locations in Whychus Creek. Data collected annually.<br>2. 2006-2016: Measure instream flow and verify that benchmark targets are met throughout summer seasons. | 1. DRC will install and manage gauges and data.<br>2. DRC will lead on water conservation, marketing, leasing, and acquisition.<br>3. Develop landowner relationships: share info with partners and maintain coordinated outreach among DBLT, DRC and UDWC.<br>4. DRC will coordinate with OWRD on all gauges. |

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|  |  |  | leasing (target: 1.5 cfs instream).<br>6. 2007-2008: Establish Water Bank (Target: 1.25 cfs instream).<br><b>Acquisition</b><br>7. 2007-2008: Water acquisitions. |  |  |
|--|--|--|---|--|--|

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| <b>Fish Habitat Restoration</b>  |   |  |  |  |   |
|--|---|--|--|--|---|
| <b>Measurable Restoration Objectives</b>   | <b>Hypothesis</b>   | <b>Interim Benchmarks</b>  | <b>Tasks and Timeframe</b>   | <b>Metrics</b>   | <b>Roles and Responsibilities</b>   |
| <p>1. Restore stream habitat necessary to support applicable life history stages of steelhead and redband trout, bull trout and chinook salmon.</p> <p>2. Measure, evaluate, and document improving trends in aquatic habitat conditions. Measurements will likely include</p> <p>a) Habitat complexity;</p> <p>b) Native riparian vegetation extent and width;</p> <p>c) LWD presence and distribution;</p> <p>d) Residual pool depth;</p> <p>e) Pool frequency;</p> <p>f) Percent sediment;</p> <p>g) Spawning gravel; and</p> <p>h) Channel geometry.</p> | <p>H<sup>1</sup>: Improving habitat attributes will facilitate:</p> <p>a) Improved water quality;</p> <p>b) Increased juvenile production;</p> <p>c) Increased populations of resident fish;</p> <p>d) Increased distribution of target species; and</p> <p>e) Additional benefits for non-target species (e.g., migratory birds, terrestrial wildlife, etc.)</p> | <p>1. 2007: Review baseline conditions compiled by PGE, CTWS and ODFW.</p> <p>2. Develop specific habitat restoration targets and baseline with PGE, CTWS and ODFW.</p> <p>3. 2012: Meet 50% of habitat restoration targets.</p> <p>4. 2016: Meet 100% of habitat restoration targets.</p> | <p>1. 2007: Compile information on baseline conditions.</p> <p>2. 2008: Develop habitat restoration targets.</p> <p>3. 2006-2008: Camp Polk Meadow restoration. 2006: Complete design, 2008: Complete implementation, 2016: Complete monitoring.</p> <p>4. 2007-2008: Evaluate existing habitat conditions to develop baseline for future comparison (with PGE, CTWS, ODFW and USFWS).</p> <p>5. 2007-2008: Complete Rimrock Ranch restoration -- restore 1.6 miles. Design phase completed by 2006, Implementation phases completed by 2008. Project includes floodplain restoration, erosion control, LWD placement, instream restoration.</p> <p>6. 2006-2015: Recruit additional restoration projects. Benchmark: One new restoration project implemented per year 2008-2016.</p> <p>7. 2007-2016: Track progress.</p> | <p>1. 2007-2016: Habitat surveys conducted to measure progress toward restoration targets. Measurements will likely include:</p> <p>a) Habitat complexity;</p> <p>b) Native riparian vegetation extent and width;</p> <p>c) LWD presence and distribution;</p> <p>d) Residual pool depth;</p> <p>e) Pool frequency;</p> <p>f) Percent sediment;</p> <p>g) Spawning gravel; and</p> <p>h) Channel geometry.</p> | <p>1. CTWS and ODFW will provide habitat baseline and target production information, and conduct habitat monitoring. (UDWC may assist pending funding availability).</p> <p>2. UDWC, DBLT and DRC will compile habitat baseline information.</p> <p>3. Camp Polk Meadow Restoration: UDWC, DBLT, USFS</p> <p>4. Rimrock Ranch Restoration: UDWC, DBLT, DRC, USFS</p> <p>3. UDWC responsible for developing and prioritizing new restoration opportunities in priority reach (downstream of Sisters).</p> <p>4. DBLT, DRC, UDWC will coordinate in the development of landowner relationships and information sharing with partners (e.g., data feedback, outreach).</p> |

**Upper Deschutes Basin Model Watershed  
Whychus Creek Program Matrix**

| <b>Fish Passage Restoration</b>  |   |   |  |   |   |
|--|---|---|--|---|---|
| <b>Measurable Restoration Objectives</b>   | <b>Hypothesis</b>   | <b>Interim Benchmarks</b>   | <b>Tasks and Timeframe</b>   | <b>Metrics</b>  | <b>Roles and Responsibilities</b>                                   |
| 1. Provide unimpeded up and downstream fish passage consistent with ODFW standards to Whychus Creek Falls. | H <sup>1</sup> : Unimpeded fish passage will open life history pathways essential to restoring natural distribution of target species.<br>H <sup>2</sup> : Unimpeded passage will facilitate seasonal migrations that will expand life history diversity and increase abundance, genetic diversity, and distribution of target species. | 1. 2007: Establish priority list of passage barriers.<br>2. 2010: Complete screening or passage projects downstream of Sisters.<br>3. 2016: Facilitate unimpeded fish passage throughout creek. | 1. 2007: Establish priority list of passage barriers.<br>2. 2007-2009: Develop projects through community outreach<br>3. 2008-2016: Secure funding and landowner contacts<br>4. 2008-2016 Implement projects per established timeframe and priorities. | 1. Verify consistency with ODFW passage criteria at each identified fish passage barrier.<br>2. Map expanding distribution of target species beyond present day barriers. | 1. Lead entity: UDWC<br>2. Supporting roles: DRC, ODFW, OWRD, USFS. |

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| <b>Land Conservation</b>   |   |   |  |   |   |
|--|---|---|--|---|---|
| <b>Measurable Restoration Objectives</b>   | <b>Hypothesis</b>   | <b>Interim Benchmarks</b>   | <b>Tasks and Timeframe</b>   | <b>Metrics</b>  | <b>Roles and Responsibilities</b>   |
| 1. Acquire conservation easements on the seven remaining lower Whychus Creek parcels that contain significant stream frontage and riparian acreage. (these six parcels will integrate/ intersect with the three parcels already conserved on lower Whychus Creek). | H <sup>1</sup> : With rapidly expanding urbanization, it will be essential to conserve habitats located on private lands in Whychus Creek. The conservation and restoration of 10 priority parcels on lower Whychus Creek will allow for the improvement and perpetual maintenance of habitat critical to target species. | <ol style="list-style-type: none"> <li>2006. Complete Rimrock Ranch conservation easement and begin restoration planning.</li> <li>2009: Obtain two additional easements / preserves on lower Whychus and initiate restoration.</li> <li>2011: Obtain two additional easements / preserves on lower Whychus and initiate restoration.</li> <li>2013: Obtain final two easements targeted for lower reach properties and initiate restoration.</li> <li>2016: Complete necessary restoration and management actions on all parcels.</li> </ol> | <ol style="list-style-type: none"> <li>2006-2016: Maintain ongoing outreach campaign to lower Whychus landowners; recruit and develop acquisition projects.</li> <li>Obtain easements per interim benchmarks timeline.</li> <li>Coordinate with UDWC (and other appropriate parties) to design and implement restoration of easement parcels.</li> <li>Where applicable, coordinate with DRC (and other appropriate parties) to design and implement water conservation projects on easement parcels.</li> </ol> | <ol style="list-style-type: none"> <li>Maintain and update GIS map of lower Whychus Creek easement projects.</li> </ol> | <ol style="list-style-type: none"> <li>DBLT is lead entity for land conservation tasks and objectives.</li> <li>DBLT and UDWC will coordinate on restoration of easement properties / preserves.</li> <li>DBLT, DRC and UDWC will coordinate and continue to develop landowner relationships and share information/data with stakeholders and partners</li> </ol> |

**Upper Deschutes Basin Model Watershed  
Whychus Creek Program Matrix**

| <b>Biological Recovery</b>   |  |   |   |  |  |
|--|--|---|---|--|--|
| <b>Measurable Restoration Objectives</b>   | <b>Hypothesis</b>  | <b>Interim Benchmarks</b>   | <b>Tasks and Timeframe</b>  | <b>Metrics</b>   | <b>Roles and Responsibilities</b>  |
| <p>1. Steelhead and chinook production meets targets set by CTWS and ODFW.</p> <p>2. Redband and bull trout populations to meet targets set by CTWS, ODFW, USFWS.</p> <p>3. Statistically significant improvement in macroinvertebrate species richness and diversity.</p> | <p>H<sup>1</sup>: With adequate passage through mainstem Columbia and lower Deschutes dams, the suite of restoration actions proposed herein will provide the spawning, rearing, holding, and migration habitat necessary to support juvenile fish production and resident fish populations that meet specified targets.</p> <p>H<sup>2</sup>: The suite of restoration actions proposed herein will improve water quality and increase habitat complexity such that macro-invertebrate richness and diversity increase.</p> | <p>1. 2007: CTWS, ODFW and NOAA to set juvenile fish production targets for steelhead and chinook.</p> <p>2. 2007: CTWS, ODFW and USFWS to set fish population targets for redband and bull trout.</p> <p>3. 2008: Establish baseline for macroinvertebrate species richness and diversity.</p> <p>4. 2010-2016: Upward trend in production of juvenile steelhead and chinook.</p> <p>5. 2010-2016: Demonstrated progress toward population targets for redband and bull trout.</p> | <p>1. 2005 (Completed): Established macroinvertebrate monitoring baseline.</p> <p>2. 2008-2016: Conduct macroinvertebrate monitoring.</p> <p>3. 2007: CTWS, ODFW and USFWS and NOAA to finalize production and population targets.</p> <p>4. 2007: Coordinate with PGE, CTWS, ODFW, NOAA and USFWS for juvenile production and population monitoring, including information exchange and reporting.</p> <p>5. 2006-2016: Evaluate program and adjust as needed.</p> <p>6. 2011-2016: Adjust targets and timeframes based on past results.</p> | <p>1. 2007: Juvenile fish production targets for steelhead and chinook.</p> <p>2. 2007: Population targets for redband and bull trout.</p> <p>2. 2007-2016: Monitoring of juvenile fish production and populations (PGE, CTWS, ODFW and USFWS through a) Redd counts, b) juvenile surveys, and c) outmigrant trapping)</p> <p>4. 2007-2016. Conduct macro-invertebrate monitoring; evaluate changes.</p> | <p>1. CTWS and ODFW will determine juvenile production targets for steelhead and chinook, and conduct monitoring.</p> <p>2. ODFW and USFWS will determine redband and bull trout population targets, and conduct monitoring.</p> <p>3. UDWC to coordinate biological information, reporting to integrate into watershed restoration planning.</p> <p>4. UDWC to coordinate macroinvertebrate monitoring.</p> |

**Upper Deschutes Basin Model Watershed  
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| <b>Outreach and Project Recruitment</b>  |   |  |   |  |  |
|--|---|--|---|--|--|
| <b>Measurable Restoration Objectives</b>   | <b>Hypothesis</b>   | <b>Interim Benchmarks</b>  | <b>Tasks and Timeframe</b>  | <b>Metrics</b>   | <b>Roles and Responsibilities</b>                |
| <p>1. Engage key landowners and community members in restoration.</p> <p>2. Establish broad constituency of community members supportive of watershed restoration efforts.</p> | <p>H<sup>1</sup>: Widespread, vigorous, and sustained support from the community is critical to our ability to restore habitat conditions that can sustain populations of target species.</p> | <p>1. Design and execute coordinated outreach campaign.</p> <p>2. 2007: Contact each landowner who holds water rights and/or owns property along the creek. Introduce them to our watershed restoration vision and strategy; discuss interest and concerns, and invite/encourage participation.</p> <p>3. 2007-2016: Hold at least two public events each year to inform the community regarding restoration opportunities (and where appropriate, results).</p> <p>4. 2007-2016: Provide at least two volunteer</p> | <p>1. 2007: Design coordinated outreach campaign to reach and engage community.</p> <p>2. 2007: Produce outreach materials including annual calendar of outreach activities</p> <p>3. 2007-2010: Host tours and presentations at Camp Polk Meadow Preserve, Rimrock Ranch, and Alder Springs Ranch demonstrating projects, progress, and opportunities to community.</p> <p>4. 2007-2010: Provide volunteer opportunities each year for community to participate in stewardship and restoration (Camp Polk Meadow, Rimrock)</p> <p>5. 2007: Establish contact with each landowner who holds water rights and/or owns property along the creek.</p> <p>6. 2007: Hold a community outreach meeting on reintroduction to launch program.</p> <p>7. 2007: Hold a private irrigators community meeting launch program.</p> <p>8. 2008-2016: Hold three public events and two volunteer opportunities per year.</p> | <p>1. Document increase in public participation and involvement through attendance at events/meetings and volunteer projects.</p> <p>2. Document increase in landowner participation through newly secured restoration and conservation opportunities.</p> | <p>1. UDWC, DRC, DBLT shared responsibility.</p> |

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|--|--|--|--|--|--|
|  |  | opportunities each year for the community to participate in planting, monitoring or stewardship. |  |  |  |
|--|--|--|--|--|--|

**Upper Deschutes Basin Model Watershed  
Whychus Creek Program Matrix**

| <b>Water Quality</b>   |  |  |  |   |   |
|--|--|--|--|---|---|
| <b>Measurable Restoration Objectives</b>   | <b>Hypothesis</b>  | <b>Interim Benchmarks</b>  | <b>Tasks and Timeframe</b>   | <b>Metrics</b>  | <b>Roles and Responsibilities</b>   |
| <p>1. Throughout Whychus Creek: restore (or maintain) water quality and temperature standards consistent with State of Oregon salmonid rearing and spawning criteria:</p> <p>a) Temp: 7-day avg. max &lt;64.4° C.</p> <p>b) pH: 6.5-8.5</p> <p>c) TDS &lt; 500mg/l</p> <p>d) D.O.: spawning and emergence &gt;11.0 mg/l</p> <p>e) D.O.: other &gt;9.0 mg/l</p> | <p>H<sup>1</sup>: Water quality parameters consistent with Oregon State standards will expand opportunities for target species to fulfill a full suite of life history strategies.</p> | <p>1. 1997-2006 (Completed): Document baseline temperature conditions.</p> <p>2. 2007: Document baseline pH, DO and TDS. Identify key indicator parameters to be monitored over time.</p> <p>3. 2009-2016: Document statistically significant improvements where conditions do not meet standards.</p> <p>3. 2006-2016: Maintain water quality benchmarks where existing water quality parameters meet Oregon standards.</p> | <p>1. 2006-2016: Continue implementation of temperature monitoring at established locations.</p> <p>2. 2007-2016: Conduct pH, DO and TDS monitoring.</p> <p>3. 2007-2016: Evaluate data and complete analyses that feedback into restoration priorities, strategies, and actions.</p> <p>4. 2007-2016: Adjust monitoring priorities as needed to target most significant problems.</p> | <p>1. 2006-2016: Deploy temperature probes at established monitoring locations.</p> <p>2. 2007-2016: Deploy pH, DO and TDS probes as established monitoring locations.</p> <p>2. 2007-2016: Evaluate data annually.</p> | <p>1. UDWC will lead the monitoring through the existing UDWC Water Quality Monitoring Program.</p> |

## Upper Deschutes Basin Model Watershed Lake Creek Program Matrix

| <b>Lake Creek Restoration Goals:</b>  |   |   |  |  |  |
|---|---|---|--|--|--|
| <ul style="list-style-type: none"> <li>▪ Restore stream habitat, flows, passage and water quality necessary to support applicable life history stages of chinook and sockeye salmon, redband trout, and bull trout.</li> </ul>  |   |   |  |  |  |
| <b>Stream Flow Restoration</b>  |   |   |  |  |  |
| <b>Measurable Restoration Objectives</b>  | <b>Hypothesis</b>   | <b>Interim Benchmarks</b>   | <b>Tasks and Timeframe</b>   | <b>Metrics</b>   | <b>Roles and Responsibilities</b>  |
| <p>1. Assess existing conditions to determine if low flow is adversely affecting water quality and/ or habitat for target fish species.</p> <p>2. If scientific assessment determines that instream flows are limiting target species in Lake Creek, develop a target instream flow, and implement conservation and acquisition projects that will incrementally restore a hydrograph that approximates pre-diversion conditions.</p> | <p>H<sup>1</sup>: Existing flows in Lake Creek may limit available habitat for target species and adversely affect water quality parameters.</p> <p>H<sup>2</sup>: If scientific analysis suggests that hydrograph alterations associated with diversion of water are adversely affecting habitat forming processes or the survival of target species, we hypothesize that flow restoration will facilitate increased distribution and/or survival of target species.</p> | <p>1. 2008: Assess existing hydrology and available habitat in Lake Creek and determine if diversion of water is adversely affecting water quality or habitat for target fish species.</p> <p>2. 2008: Establish instream flow benchmarks for Lake Creek.</p> | <p>1. 2007: Establish stream gauging system on Lake Creek. Gauges will be installed on South Fork, North Fork, and Middle Fork near divergences.</p> <p>2. 2008: Conduct flow analysis to assess impacts of stream flow diversions.</p> <p>3. 2009: Establish flow restoration priorities, work plan, and timeframe for implementation of flow restoration strategy if and as necessary.</p> <p>4. 2006-2016: Explore possibilities for water rights acquisition or conversion to groundwater with landowners.</p> | <p>1. 2007-2016: Three permanent stream gauges established. Data collected and analyzed annually.</p> <p>2. If determined that flow restoration is fundamental to success of target species: document increases in instream flow and demonstrate increasing normalization of hydrograph.</p> | <p>1. DRC will coordinate gauge installation and maintenance.</p> <p>2. Flow assessment lead: DRC.</p> <p>3. Flow restoration lead: DRC.</p> |

**Upper Deschutes Basin Model Watershed  
Lake Creek Program Matrix**

| <b>Fish Habitat Restoration</b>  |   |  |  |  |   |
|--|---|--|--|--|---|
| <b>Measurable Restoration Objectives</b>   | <b>Hypothesis</b>   | <b>Interim Benchmarks</b>  | <b>Tasks and Timeframe</b>   | <b>Metrics</b>   | <b>Roles and Responsibilities</b>   |
| <p>1. Restore stream habitat necessary to support applicable life history stages of chinook and sockeye salmon, redband trout and bull trout.</p> <p>2. Measure, evaluate, and document improving trends in aquatic habitat. Measurements will likely include:</p> <p>a) Habitat complexity;</p> <p>b) Native riparian vegetation extent and width;</p> <p>c) LWD presence and distribution;</p> <p>d) Residual pool depth;</p> <p>e) Pool frequency;</p> <p>f) Percent sediment;</p> <p>g) Spawning gravel; and</p> <p>h) Channel geometry.</p> | <p>H<sup>1</sup>: Increasing and improving listed habitat attributes will facilitate:</p> <p>a) Improved water quality;</p> <p>b) Increased production of juvenile chinook salmon;</p> <p>c) Increased populations of resident fish;</p> <p>d) Increased distribution of target species; and</p> <p>e) Additional benefits for non-target species (e.g., migratory birds, terrestrial wildlife, etc.)</p> | <p>1. 2007: Assess and establish baseline conditions with CTWS, ODFW and USFWS.</p> <p>2. 2008: Develop specific habitat restoration targets with CTWS, ODFW and USFWS.</p> <p>2. 2012: Meet 50% of habitat restoration targets.</p> <p>3. 2016: Meet 100% of habitat restoration targets.</p> | <p>1. 2007: Assess baseline conditions.</p> <p>2. 2008: Develop habitat restoration targets.</p> <p>3. 2006-2007: Complete Lake Creek Lodge channel and riparian restoration project.</p> <p>4. 2008: Develop riparian vegetation restoration projects with landowners and Metolius Meadows Homeowners Assoc.</p> <p>3. 2008-2016: Develop and implement riparian restoration projects needed to meet habitat restoration targets.</p> | <p>1. 2008-2016: Habitat surveys conducted to measure progress toward restoration targets. Measurements will likely include:</p> <p>a) Habitat complexity;</p> <p>b) Native riparian vegetation extent and width;</p> <p>c) LWD presence and distribution;</p> <p>d) Residual pool depth;</p> <p>e) Pool frequency;</p> <p>f) Percent sediment;</p> <p>g) Spawning gravel; and</p> <p>h) Channel geometry.</p> | <p>1. CTWS, ODFW and USFWS will provide habitat baseline and target production information, and conduct habitat monitoring. (UDWC may assist pending funding availability).</p> <p>2. Lake Creek Lodge channel and riparian restoration project: UDWC, USFS.</p> <p>3. UDWC responsible for developing and prioritizing new restoration opportunities.</p> <p>4. DBLT, DRC, UDWC will coordinate in the development of landowner relationships and information sharing with partners (e.g., data feedback, outreach).</p> |

**Upper Deschutes Basin Model Watershed  
Lake Creek Program Matrix**

| <b>Fish Passage Restoration</b>   |   |  |  |   |  |
|---|---|--|--|---|--|
| <b>Measurable Restoration Objectives</b>  | <b>Hypothesis</b>   | <b>Interim Benchmarks</b>  | <b>Tasks and Timeframe</b>   | <b>Metrics</b>  | <b>Roles and Responsibilities</b>  |
| 1. Provide unimpeded up and downstream fish passage consistent with ODFW standards from Metolius to Blue Lake | H <sup>1</sup> : Unimpeded fish passage will open life history pathways essential to restoring natural distribution of target species.<br>H <sup>2</sup> : Unimpeded passage will facilitate seasonal migrations that will expand life history diversity and increase abundance and distribution of target species. | 1. 2007: Assess and prioritize necessary passage improvements for all unscreened diversions and culverts on Middle and South Forks of Lake Creek.<br>2. 2008: Implement screening project for North Fork-Middle Fork divergence.<br>3. 2008: Assess, and where necessary facilitate, passage through culverts at Roads 800 and 830 (Metolius Preserve) and 12 (USFS).<br>4. 2010: Complete fish passage improvements at Suttle Lake outlet (coordinate with temperature study at same site). | 1. 2007: Establish priority list of passage barriers and screens.<br>2. 2007: Facilitate passage at Lake Creek Lodge.<br>3. 2007-2009: conduct outreach program to landowners with potential passage barriers on private property.<br>4. 2012: Complete all priority screening and passage projects. | 1. Verify consistency with ODFW passage criteria at each identified fish passage barrier.<br>2. Map expanding distribution of target species beyond present day barriers. | 1. Lead entity: UDWC<br>2. Supporting roles: ODFW, OWRD, USFWS, USFS.<br>3. DBLT will take lead at Metolius Preserve.<br>3. USFS will take lead with with UDWC support at Suttle Lake and Road 12 culvert. |

**Upper Deschutes Basin Model Watershed  
Lake Creek Program Matrix**

| <b>Land Conservation</b>  |  |   |  |   |   |
|---|--|---|--|---|---|
| <b>Measurable Restoration Objectives</b>  | <b>Hypothesis</b>  | <b>Interim Benchmarks</b>   | <b>Tasks and Timeframe</b>   | <b>Metrics</b>  | <b>Roles and Responsibilities</b>   |
| 1. Acquire conservation easements on a) large, b) ecologically important, or c) contiguous Lake Creek properties. | H <sup>1</sup> : With ongoing development pressures, it will be essential to conserve habitats located on private lands in Lake Creek. The conservation and subsequent restoration of conserved parcels on Lake Creek will allow for the maintenance and improvement of habitat critical to all life history stages of target species. | 1. 2007: Obtain conservation easement on or fee title to undeveloped exchange parcel at Lake Creek mouth.<br>3. 2007: Contact 100% of landowners on streamside properties in reaches 1 and 2.<br>4. 2008: Have two easement projects underway on Lake Creek, complete outreach on all reaches.<br>5. 2010: Complete two easements and have two additional easement projects underway. | 1. 2006-2016 Continue outreach to Lake Creek landowners.<br>2. Obtain easements per interim benchmarks timeline.<br>3. Coordinate with UDWC (and other appropriate parties) to design and implement restoration of easement parcels. | 1. Maintain and update GIS map of Lake Creek easement prospects and projects.<br>2. Utilize fixed photo points to document maintenance and/or improvement in riparian and in-channel conditions of conserved properties.<br>3. Utilize repeat habitat surveys to document riparian and instream improvements consistent with stated benchmarks. | 1. Conservation lead: DBLT.<br>2. UDWC will restore easement properties.<br>3. DRC may play supporting role where easements contain water rights acquisition or conservation opportunities. |

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Lake Creek Program Matrix**

| <b>Biological Recovery</b>   |  |   |   |  |  |
|--|--|---|---|--|--|
| <b>Measurable Restoration Objectives</b>   | <b>Hypothesis</b>  | <b>Interim Benchmarks</b>   | <b>Tasks and Timeframe</b>  | <b>Metrics</b>   | <b>Roles and Responsibilities</b>  |
| <p>1. Juvenile chinook and sockeye production meets targets set by CTWS and ODFW.</p> <p>2. Redband and bull trout populations meet targets set by ODFW, CTWS, USFWS.</p> <p>3. Statistically significant improvement in macroinvertebrate species richness and diversity.</p> | <p>H<sup>1</sup>: With adequate passage through mainstem Columbia and lower Deschutes dams, the suite of restoration actions proposed herein will provide the spawning, rearing, holding, and migration habitat necessary to support juvenile fish production and resident fish populations that meet targets.</p> <p>H<sup>2</sup>: The suite of restoration actions proposed herein will improve water quality and increase habitat complexity such that macro-invertebrate richness and diversity increase.</p> | <p>1. 2007: CTWS and ODFW set juvenile fish production targets for sockeye and chinook.</p> <p>2. 2007: CTWS, ODFW and USFWS set fish population targets for redband and bull trout.</p> <p>3. 2008: Establish baseline for macroinvertebrate species richness and diversity.</p> <p>4. 2010-2016: Upward trend in juvenile production for sockeye and chinook.</p> <p>5. 2010-2016: Populations of redband and bull trout consistent with established targets.</p> <p>6. 2011-2016: Adjust targets and timeframes.</p> | <p>1. 2008: Establish macroinvertebrate monitoring baseline.</p> <p>2. 2008-2016: Conduct macroinvertebrate monitoring.</p> <p>3. 2007: CTWS, ODFW, USFS set fisheries production and population targets.</p> <p>4. 2007: Establish partnership with CTWS and ODFW for juvenile production and population monitoring, including information exchange and reporting.</p> <p>5. 2006-2016: Evaluate program and adjust as needed.</p> | <p>1. 2007: CTWS and ODFW Establish juvenile fish production targets for sockeye and chinook.</p> <p>2. 2007: CTWS, ODFW and USFWS establish population targets for redband and bull trout.</p> <p>2. 2007-2016: CTWS and ODFW monitor juvenile fish production and populations through<br/>a) Redd counts, b) juvenile surveys, and c) outmigrant trapping)</p> <p>4. 2008-2016. Conduct macro-invertebrate monitoring; evaluate changes.</p> | <p>1. CTWS and ODFW will determine juvenile production targets for sockeye and chinook, and conduct monitoring.</p> <p>2. ODFW, CTWS and USFWS will determine redband and bull trout population targets</p> <p>3. OSU Cascades to conduct macroinvertebrate monitoring.</p> <p>4. UDWC to coordinate biological information, monitoring, reporting among plan partners and between plan partners and fisheries managers.</p> |

**Upper Deschutes Basin Model Watershed  
Lake Creek Program Matrix**

| <b>Outreach and Project Recruitment</b>   |   |   |  |   |   |
|---|---|---|--|---|---|
| <b>Measurable Restoration Objectives</b>  | <b>Hypothesis</b>   | <b>Interim Benchmarks</b>   | <b>Tasks and Timeframe</b>   | <b>Metrics</b>  | <b>Roles and Responsibilities</b>   |
| <p>1. Engage key landowners and community members in restoration.</p> <p>2. Engage landowners in volunteer activities.</p> <p>3. Sustain and continue to develop broad constituency of community members supportive of watershed restoration efforts.</p> | <p>H<sup>1</sup>: Widespread, vigorous, and sustained support from the community is critical to our ability to restore habitat conditions that can sustain populations of target species.</p> | <p>1. Design and execute coordinated outreach campaign.</p> <p>2. 2007: Contact each landowner who holds water rights and/or owns property along the creek. Introduce them to our watershed restoration vision and strategy; discuss interest and concerns, and invite/encourage participation.</p> <p>3. 2007-2016: Hold at least one public event each year to inform the community regarding restoration opportunities.</p> <p>4. 2007-2016: Provide &gt;1 volunteer opportunity each year for the</p> | <p>1. 2007: Design coordinated Outreach Campaign to reach and engage community.</p> <p>2. 2007: Produce outreach materials including annual calendar of outreach activities</p> <p>3. 2007-2010: Host tours and presentations at Metolius Preserve demonstrating projects and progress to community.</p> <p>4. 2007-2010: Provide volunteer opportunities each year for community to participate in stewardship and restoration (Metolius Preserve)</p> <p>5. 2007: Establish contact with each landowner who holds water rights and/or owns property along the creek.</p> <p>6. 2007: Hold a community outreach meeting on reintroduction to launch/update program.</p> <p>7. 2007: Hold a private irrigators community meeting launch Program.</p> <p>8. 2008-2016: Hold one public event and two volunteer opportunities per year.</p> <p>9. Provide restoration/reintroduction</p> | <p>1. Document increase in public participation and involvement through attendance at events/meetings and volunteer opportunities.</p> <p>2. Document increase in landowner participation through newly secured restoration and conservation opportunities.</p> | <p>1. UDWC, DRC, DBLT shared responsibility. Model Watershed coordinator facilitates the team effort.</p> |

**Upper Deschutes Basin Model Watershed  
Lake Creek Program Matrix**

|  |  |  |   |  |  |
|--|--|--|---|--|--|
|  |  | community to participate in planting, monitoring or stewardship. | interpretive materials and opportunities at Metolius Preserve and Lake Creek Lodge. |  |  |
|--|--|--|---|--|--|

**Upper Deschutes Basin Model Watershed  
Lake Creek Program Matrix**

| <b>Water Quality</b>  |  |   |   |  |   |
|---|--|---|---|--|---|
| <b>Measurable Restoration Objectives</b>  | <b>Hypothesis</b>  | <b>Interim Benchmarks</b>   | <b>Tasks and Timeframe</b>  | <b>Metrics</b>   | <b>Roles and Responsibilities</b>   |
| <p>1. Restore water quality and temperature standards consistent with Oregon temperature criteria for salmonid spawning and rearing:</p> <p>a) Temp: 7-day avg. max &lt;64.4° C.</p> <p>b) pH: 6.5-8.5</p> <p>c) TDS &lt; 500mg/l</p> <p>d) D.O.: spawning and emergence &gt;11.0 mg/l</p> <p>e) D.O.: other &gt;9.0 mg/l</p> <p>f) Bacteria: 30 day log mean &lt; 126 E.coli/100 mg (no sample &gt;406/100mg).</p> | <p>H<sup>1</sup>: Water quality parameters consistent with Oregon State standards will expand opportunities for target species to fulfill a full suite of life history strategies.</p> | <p>1. 2007: Document baseline temperature, pH, DO, TDS and bacteria. Identify key indicator parameters to be monitored over time.</p> <p>2. 2009-2016: Document statistically significant improvements where conditions do not meet standards.</p> <p>3. 2009-2016: Maintain water quality benchmarks where existing water quality parameters meet Oregon standards.</p> <p>4. 2009: Complete analysis of outflow area at Suttle Lake to determine effect on temperature,</p> | <p>1. 2007-2016: Conduct pH, DO, TDS and bacteria monitoring.</p> <p>3. 2007-2016: Evaluate data and complete analyses that feedback into restoration priorities, strategies, and actions.</p> <p>4. 2007-2016: Adjust monitoring priorities as needed to target most significant problems.</p> | <p>1. 2007-2016: Conduct temperature, pH, DO, TDS and bacteria monitoring at mouth, trail 99 and Suttle Lake gauge.</p> <p>2. 2007-2016: Evaluate data annually.</p> | <p>1. UDWC will lead the monitoring through the existing UDWC Water Quality Monitoring Program.</p> |

**Upper Deschutes Basin Model Watershed  
Lake Creek Program Matrix**

|  |  |  |  |  |  |
|--|--|--|--|--|--|
|  |  | coordinate any recommendations with passage project at same site.<br>5. 2016:<br>Demonstrate statistically improving water quality conditions. |  |  |  |
|--|--|--|--|--|--|

**Upper Deschutes Basin Model Watershed  
Lower Crooked River Program Matrix**

| <b>Lower Crooked River Restoration Objective:</b>  |   |   |  |  |  |
|--|---|---|--|--|--|
| <ul style="list-style-type: none"> <li>Restore stream habitat, upland conditions, flows, passage and water quality necessary to support applicable life history stages of steelhead, redband trout, bull trout and chinook salmon.</li> </ul>  |   |   |  |  |  |
| <b>Stream Flow Restoration</b>   |   |   |  |  |  |
| <b>Measurable Restoration Objectives</b>   | <b>Hypothesis</b>   | <b>Interim Benchmarks</b>   | <b>Tasks and Timeframe</b>   | <b>Metrics</b>   | <b>Roles and Responsibilities</b>  |
| <p>1. Assess existing conditions to determine if low flow is adversely affecting water quality and/or habitat for target fish species.</p> <p>2. If scientific assessment determines that instream flows are limiting target species in the program area, develop target instream flows for each stream and implement conservation and acquisition projects that will incrementally restore a hydrograph that ensures the natural hydrologic function necessary to support native life history pathways of target species.</p> | <p>H<sup>1</sup>: Existing flows in program area streams may limit available habitat and life history pathways for target species and adversely affect water quality parameters.</p> <p>H<sup>2</sup>: If scientific analysis suggests that hydrograph alterations associated with diversion of water are adversely affecting habitat forming processes or the survival of target species, we hypothesize that flow restoration will facilitate increased distribution and/or survival of target species.</p> | <p>1. By 2007: Establish stream flow monitoring program with gauges.</p> <p>2. By 2009: Establish specific streamflow and hydrograph restoration targets for all three project streams.</p> <p>3. 2009: Prioritize flow restoration opportunities based on measurable instream flow objectives.</p> <p>4. 2015: Demonstrate statistical instream flow increases achieved in program area.</p> | <p>1. 2007: Establish and maintain stream flow gauges: a) McKay – mouth, Jones Dam, USFS boundary; b) Ochoco – mouth; c) Crooked – downstream of Prineville.</p> <p>2. 2007-2009: Establish streamflow restoration benchmarks according to the following steps: a) Identify flow targets; b) Assess current flow conditions and quantify effect of irrigation withdrawals (and storage); c) Develop and prioritize stream flow restoration opportunities (2007 – McKay; 2008 – Crooked; 2009 – Ochoco)</p> <p>3. 2006-2016: Establish landowners contacts and initiate flow restoration activities, including leasing, conservation, transfers and water exchanges.</p> <p>4. 2007-2016: Support/initiate (with partners) a reallocation process for Prineville Reservoir.</p> | <p>1. 2007: Permanent stream gages established at the specified locations.</p> <p>2. 2007-2016: Stream flow Data collected and analyzed annually.</p> <p>3. 2008-2016: Document increases in instream flow and demonstrate increasing normalization of hydrograph.</p> | <p>1. CRWC and DRC will coordinate gage installation and maintenance.</p> <p>2. Flow assessment lead: DRC</p> <p>3. Flow restoration lead: DRC</p> |

**Upper Deschutes Basin Model Watershed  
Lower Crooked River Program Matrix**

| <b>Habitat Restoration</b>  |   |   |   |  |   |
|---|---|---|---|--|---|
| <b>Measurable Restoration Objectives</b>  | <b>Hypothesis</b>   | <b>Interim Benchmarks</b>   | <b>Tasks and Timeframe</b>  | <b>Metrics</b>   | <b>Roles and Responsibilities</b>   |
| <p>1. Restore riparian and upland habitat necessary to support stable, self-sustaining populations of target fish species.</p> <p>2. Measure, evaluate, and document improving trends in aquatic habitat conditions to include:</p> <p>a) increasing habitat complexity measures</p> <p>b) native riparian vegetation extent and width</p> <p>c) LWD pieces/mile</p> <p>d) Residual pool depth</p> <p>e) Pool frequency</p> <p>f) Pool area</p> <p>g) % Fine sediment</p> <p>h) % Spawning gravel</p> | <p>H<sup>1</sup>: Increasing and improving listed habitat attributes will facilitate:</p> <p>a) Improved water quality;</p> <p>b) Increased juvenile production;</p> <p>c) Increased populations of resident fish;</p> <p>d) Increased distribution of target species; and</p> <p>e) Additional benefits for non-target species (e.g., migratory birds, terrestrial wildlife, etc.)</p> | <p>1. 2007: Compile baseline conditions with PGE, CTWS, ODFW and NOAA.</p> <p>2. Document improving instream and riparian habitat indices and scores on McKay Creek by 2010.</p> <p>3. On Ochoco and Crooked River (within prioritized project reaches) document improving instream and riparian habitat indices and scores by 2020.</p> <p>4. Assess impact of upland function on riparian and aquatic habitat conditions.</p> | <p>1. 2007: Compile information on baseline conditions.</p> <p>2. 2008: Develop habitat restoration targets.</p> <p>3. <u>McKay Creek</u></p> <p>a) 2006-2007: Complete restoration on Mid-McKay project: includes berm removal, grazing management, off-stream watering, rock and log instream structures along 1 mile of channel.</p> <p>b) 2006-2007: Complete restoration on Sealy Project (4 landowners--.75 mile channel) berm removal, grazing management, off-stream watering, rock and log instream structures.</p> <p>c) 2006: Complete restoration at Weston Property (1 landowner, .25 miles of channel).</p> <p>d) 2007: Policy/management response to ATV use on USFS portion of creek.</p> <p>4. <u>Crooked River</u></p> <p>a) 2006-2007: Complete City of Prineville Wetland restoration (2 mile segment)—berm removal, riparian planting.</p> <p>b) 2006-2007: Complete Canyons</p> | <p>1. 2006: Habitat survey on all of Ochoco Creek and un-surveyed portions of Crooked River (underway).</p> <p>2. 2007-2016: Habitat surveys conducted to measure progress toward restoration targets. Indicators will likely include:</p> <p>a) Habitat complexity;</p> <p>b) Native riparian vegetation extent and width;</p> <p>c) LWD presence and distribution;</p> <p>d) Residual pool depth;</p> <p>e) Pool frequency;</p> <p>f) Percent sediment;</p> <p>g) Spawning gravel; and</p> <p>h) Channel geometry.</p> | <p>1. CRWC lead on all restoration activities.</p> <p>2. PGE, CTWS, ODFW and USFWS will provide habitat baseline and target information.</p> <p>3. CRWC and DRC intern will compile habitat baseline information.</p> <p>4. CRWC responsible for developing and prioritizing new restoration opportunities in priority reaches</p> <p>5. DBLT, DRC, CRWC will coordinate in the development of landowner relationships and information sharing with partners (e.g., data feedback, outreach).</p> |

**Upper Deschutes Basin Model Watershed  
Lower Crooked River Program Matrix**

|  |  |  |   |  |  |
|--|--|--|---|--|--|
|  |  |  | <p>Ranch Springs restoration—<br/>restoration of cold-water spring<br/>inputs to crooked mainstem.</p> <p>c) 2007-2008: Complete boulder/<br/>LWD structure placement in a 2-<br/>mile stretch of river upstream of<br/>Prineville.</p> <p>5. <u>Ochoco Creek</u></p> <p>a) 2007-2008: Complete 1 mile of<br/>restoration.</p> <p>b) examine policy needs related<br/>to development pressure and<br/>riparian mgmt.</p> <p>6. <u>General</u></p> <p>a) Prioritize upland restoration<br/>needed to ensure riparian<br/>function. Including juniper<br/>control/impacts of water<br/>quantity/quality and noxious<br/>weeds</p> <p>b) CRWC Native Plant<br/>Propagation: Establish<br/>greenhouse program to raise<br/>40,000 plants per year by 2010.</p> <p>c) 2006-2016: Recruit additional<br/>restoration projects. Benchmark:<br/>two new restoration projects in<br/>priority areas implemented per<br/>year 2008-2016.</p> <p>d) 2007-2016: Track progress.</p> |  |  |
|--|--|--|---|--|--|

**Upper Deschutes Basin Model Watershed  
Lower Crooked River Program Matrix**

| <b>Fish Passage Restoration</b>  |   |   |  |  |   |
|--|---|---|--|--|---|
| <b>Measurable Restoration Objectives</b>   | <b>Hypothesis</b>   | <b>Interim Benchmarks</b>   | <b>Tasks and Timeframe</b>   | <b>Metrics</b>   | <b>Roles and Responsibilities</b>   |
| <p>Provide unimpeded up and downstream fish passage consistent with ODFW standards to:</p> <p>a) First natural upstream migration barrier on McKay Creek,</p> <p>b) To Bowman Dam on the Crooked, and</p> <p>c) To Ochoco Dam on Ochoco Creek.</p> | <p>H<sup>1</sup>: Unimpeded fish passage will open life history pathways essential to restoring natural distribution of target species.</p> <p>H<sup>2</sup>: Unimpeded passage will facilitate seasonal migrations that will expand life history diversity and increase abundance of target species.</p> | <p>1. 2006: Complete fish passage barrier assessment.</p> <p>2. 2006: prioritize fish passage barriers in program area for improvement.</p> <p>3. Facilitate unimpeded fish passage throughout lower Crooked by 2016.</p> | <p>1. 2006: Complete fish passage barrier assessment.</p> <p>2. 2006: prioritize fish passage barriers in program area.</p> <p>3. 2006-2016: Conduct outreach and engage landowners in passage improvement projects.</p> | <p>1. Verify consistency with ODFW passage criteria at each identified fish passage barrier.</p> <p>2. Map expanding distribution of target species beyond present day barriers.</p> | <p>1. Lead entity: CRWC</p> <p>2. Supporting roles: ODFW, OWRD, USFWS, NOAA</p> |

**Upper Deschutes Basin Model Watershed  
Lower Crooked River Program Matrix**

| <b>Land Conservation</b>   |   |  |   |  |  |
|--|---|--|---|--|--|
| <b>Measurable Restoration Objectives</b>   | <b>Hypothesis</b>   | <b>Interim Benchmarks</b>  | <b>Tasks and Timeframe</b>  | <b>Metrics</b>   | <b>Roles and Responsibilities</b>  |
| <p>1. Establish easements and implement habitat enhancement projects within the designated priority land conservation areas that include:</p> <p>a) McKay Creek,</p> <p>b) Large agricultural parcels between Canyons Ranch and Prineville</p> <p>c) Between Ochoco dam and Prineville</p> | <p>H<sup>1</sup>: With rapidly expanding urbanization, conservation of large private agricultural properties adjacent to riparian areas will be required in order to improve and sustain habitat for target species.</p> <p>H<sup>2</sup>: Easements and associated restoration agreements will allow for the maintenance and improvement of habitat critical to all life history stages of target species.</p> | <p>1. 2007: Establish landowner outreach program that targets priority conservation areas.</p> <p>2. By 2008: Establish 3 easements in priority areas. Establish one Community Preserve on a priority reach and initiate restoration, interpretation and education.</p> <p>3. By 2011: complete restoration and habitat enhancement on three easement properties.</p> <p>4. By 2015 Establish three additional easements in designated priority areas.</p> | <p>1. Conduct landowner outreach program in priority conservation areas.</p> <p>2. Develop easement opportunities and pursue conservation easements. Develop strategies and additional funding sources for agricultural properties.</p> <p>4. Continue ongoing development of restoration opportunities on easement properties.</p> <p>5. Pursue enrollment in CREP</p> | <p>1. Maintain and update GIS map of Crooked River easement projects.</p> <p>2. Index stream habitat surveys conducted at five year intervals.</p> <p>3. Repeat photographs taken at each easement or restoration site</p> | <p>1. DBLT takes lead role.</p> <p>2. CRWC plays supporting role in restoration of conserved properties.</p> <p>3. CRWC and SWCD share lead in enrolling landowners in CREP.</p> <p>4. CRWC coordinates water conservation component of CREP with DRC.</p> |

**Upper Deschutes Basin Model Watershed  
Lower Crooked River Program Matrix**

| <b>Biological Recovery</b>  |  |  |  |   |  |
|---|--|--|--|---|--|
| <b>Measurable Restoration Objectives</b>  | <b>Hypothesis</b>  | <b>Interim Benchmarks</b>  | <b>Tasks and Timeframe</b>   | <b>Metrics</b>  | <b>Roles and Responsibilities</b>  |
| <p>1. Juvenile steelhead and Chinook production meets targets set by CTWS, ODFW, NOAA.</p> <p>2. Tedband and bull trout populations to meet targets set by ODFW, CTWS, USFWS.</p> <p>3. Document a statistically significant improvement in macroinvertebrate species richness and diversity.</p> | <p>H<sup>1</sup>: With adequate passage through mainstem Columbia and lower Deschutes dams, the suite of restoration actions proposed herein will provide the spawning, rearing, holding, and migration habitat necessary to support juvenile fish production and resident fish populations that meet targets.</p> <p>H<sup>2</sup>: The suite of restoration actions proposed herein will improve water quality and increase habitat complexity such that macro-invertebrate richness and diversity increase.</p> | <p>1. 2007: CTWS, ODFW and NOAA to set juvenile fish production targets for steelhead and chinook.</p> <p>2. 2007: CTWS, ODFW and USFWS to set fish population targets for redband and bull trout.</p> <p>3. 2008: Establish baseline for macroinvertebrate species richness and diversity.</p> <p>4. 2010-2016: Document statistical upward trend in juvenile fish production for steelhead and chinook.</p> <p>5. 2010-2016: Document population status for redband and bull trout.</p> <p>6. 2011-2016: Adjust targets and timeframes based</p> | <p>1. 2007: Establish macroinvertebrate monitoring baseline.</p> <p>2. 2008-2016: Conduct macroinvertebrate monitoring.</p> <p>3. 2007: CTWS, ODFW and NOAA to set steelhead production and population targets.</p> <p>4. 2007: Coordinate with CTWS, ODFW and USFWS on juvenile production and population monitoring, including information exchange and reporting.</p> <p>5. 2006-2016: Evaluate program and adjust as needed.</p> | <p>1. 2007: Juvenile production targets established for steelhead and chinook.</p> <p>2. 2007: Population targets established for redband and bull trout.</p> <p>2. 2007-2016: PGE, CTWS, and ODFW monitor populations through<br/>a) Redd counts, b) juvenile surveys, and c) outmigrant trapping)</p> <p>4. 2008-2016. Conduct macro-invertebrate monitoring; evaluate changes.</p> | <p>1. CTWS, ODFW and NOAA will determine juvenile production targets for steelhead and chinook.</p> <p>2. CTWS, ODFW and USFWS will determine redband and bull trout population targets</p> <p>3. CRWC to coordinate biological information, monitoring, reporting.</p> <p>4. CRWC to coordinate macroinvertebrate monitoring.</p> |

**Upper Deschutes Basin Model Watershed  
Lower Crooked River Program Matrix**

|  |  |                  |  |  |  |
|--|--|------------------|--|--|--|
|  |  | on past results. |  |  |  |
|--|--|------------------|--|--|--|

**Upper Deschutes Basin Model Watershed  
Lower Crooked River Program Matrix**

| <b>Outreach and Project Recruitment</b>   |   |  |  |   |  |
|---|---|--|--|---|--|
| <b>Measurable Restoration Objectives</b>  | <b>Hypothesis</b>   | <b>Interim Benchmarks</b>  | <b>Tasks and Timeframe</b>   | <b>Metrics</b>  | <b>Roles and Responsibilities</b>  |
| <p>1. Engage key landowners and community members in watershed restoration.</p> <p>2. Engage landowners in restoration or volunteer activities.</p> <p>3. Maintain and build broad constituency of community members supportive of watershed restoration efforts.</p> | <p>H<sup>1</sup>: Widespread, vigorous, and sustained support from the community is critical to our ability to restore habitat conditions that can sustain populations of target species.</p> | <p>1. 2007: Contact landowners in program area. Introduce them to our watershed restoration vision and strategy; discuss interest and concerns, and invite/encourage participation.</p> <p>2. 2007-2016: Hold at least two public events each year to inform the community regarding restoration opportunities.</p> <p>3. 2007-2016: Provide at least two volunteer opportunities each year for the community to participate in planting, monitoring or stewardship.</p> | <p>1. 2007: Produce annual calendar of outreach activities.</p> <p>2. By 2007: Establish contact with every McKay Creek landowner, ramp up outreach to lower Crooked and Ochoco Creek landowners.</p> <p>3. 2008-2016: Hold two public events per year.</p> <p>4. 2008-2016: Provide two volunteer opportunities per year, including annual Smith Rock and Ochoco Creek clean up events.</p> | <p>1. Document increase in public participation and involvement through attendance at events/meetings.</p> <p>2. Document increase in landowner participation through newly secured restoration and conservation opportunities.</p> | <p>1. CRWC, DRC, DBLT shared responsibility. CRWC coordinator facilitates the team effort.</p> |

**Upper Deschutes Basin Model Watershed  
Lower Crooked River Program Matrix**

| <b>Water Quality</b>  |  |  |   |   |  |
|---|--|--|---|---|--|
| <b>Measurable Restoration Objectives</b>  | <b>Hypothesis</b>  | <b>Interim Benchmarks</b>  | <b>Tasks and Timeframe</b>  | <b>Metrics</b>  | <b>Roles and Responsibilities</b>  |
| <p>1. Restore/Maintain water quality and temperature standards consistent with State of Oregon salmonid spawning and rearing criteria throughout program area.</p> <p>2. Complete TMDL and establish specific restoration targets for Crooked River, Ochoco Creek, McKay Creek.</p> | <p>H<sup>1</sup>: Water quality parameters consistent with Oregon State standards will expand opportunities for target species to fulfill a full suite of life history strategies.</p> | <p>1. By 2007: document and establish baseline water quality data.</p> <p>2. By 2007: Set specific water quality benchmarks and timeframes for achieving objectives.</p> <p>3. 2009-2016: Document statistically significant improvements where conditions do not meet standards.</p> <p>4. 2006-2016: Maintain water quality benchmarks where existing water quality parameters meet Oregon standards.</p> <p>5. By 2012: Demonstrate statistically significant improvements in McKay Creek</p> | <p>1. 2006-2016: establish water quality and temperature monitoring program for Ochoco, McKay, and Crooked River.</p> <p>3. 2007-2016: Evaluate data and complete analyses that feedback into restoration priorities, strategies, and actions.</p> <p>4. 2007-2016: Adjust monitoring priorities as needed to target most significant problems.</p> | <p>1. 2006-2016: Temperature probes installed at priority locations in lower Crooked.</p> <p>2. 2007-2016: water quality monitoring program established in Ochoco, Crooked, McKay.</p> <p>3. 2007-2016: Evaluate data annually.</p> | <p>1. CRWC is lead.</p> <p>2. Monitoring may be coordinated with UDWC, BLM, USFS, DEQ.</p> |

**Upper Deschutes Basin Model Watershed  
Lower Crooked River Program Matrix**

|  |  |   |  |  |  |
|--|--|---|--|--|--|
|  |  | water quality and early summer temperatures where standards were below stated project objectives. |  |  |  |
|--|--|---|--|--|--|

## Whychus Creek 10-year Project Timeline and Projected Monitoring and Reporting Actions

| Project Objective  | Year  |      |      |      |      |      |      |      |      |      |      |      |      |
|--|-------|------|------|------|------|------|------|------|------|------|------|------|------|
|  | <2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
| Streamflow Gaging: maintain 4 gages: install and maintain 5 <sup>th</sup> gage by 2008)    | X     | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |      |
| Stream and Riparian Habitat Surveys  | X     |      |      |      |      |      |      | X    |      |      |      | X    |      |
| Survey and map expanding distribution of target species..                                  |       |      |      |      |      | X    |      |      |      |      |      | X    |      |
| Maintain GIS map of lower Whychus Creek conservation easements/projects.                   |       |      |      | X    |      | X    |      | X    |      | X    |      | X    |      |
| Establish and revisit photo points in restoration reference reaches.                       |       |      | X    |      | X    |      | X    |      | X    |      | X    |      | X    |
| 2007-2016. Conduct macro-invertebrate monitoring   |       |      | TBD  | TBD  | TBD  | TBD  | TBD  | TBD  | TBD  | TBD  | TBD  | TBD  |      |
| Juvenile surveys for resident redband and bull trout                                       |       |      |      | X    | X    | X    | X    | X    | X    | X    | X    | X    |      |
| Juvenile surveys for Chinook and steelhead   |       |      |      | X    | X    | X    | X    | X    | X    | X    | X    | X    |      |
| Redd Counts  |       |      |      |      | X    | X    | X    | X    | X    | X    | X    | X    |      |
| Outmigrant smolt trapping  |       |      |      | X    | X    | X    | X    | X    | X    | X    | X    | X    |      |
| Document and tally new restoration partnerships and projects implemented on private lands  |       |      | X    |      | X    |      | X    |      | X    |      | X    |      |      |
| Water quality monitoring   | X     | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |      |
| Stream temperature monitoring  | X     | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |      |
| Channel geomorphology and cross-section surveys at reference reaches (Rim rock, Camp Polk) |       |      | TBD  | TBD  | TBD  | TBD  | TBD  | TBD  | TBD  |      |      |      |      |
| Peer review by Independent Team  |       |      | X    |      |      | X    |      |      | X    |      |      |      |      |
| Brief Interim Update Report  |       |      |      | X    | X    |      | X    | X    |      | X    | X    | X    |      |
| Comprehensive, cumulative report   |       |      |      |      |      | X    |      |      | X    |      |      |      |      |
| Final Report   |       |      |      |      |      |      |      |      |      |      |      |      | X    |
| Meet with BEF and present results  |       |      |      | TBD  | TBD  | TBD  | TBD  | TBD  | TBD  | TBD  | TBD  | TBD  | TBD  |

Proposed actions are contingent upon adequate funding and pledged support from PGE, CTWS, and ODFW biologists.

## Lake Creek 10-year Project Timeline and Projected Monitoring and Reporting Actions

| Project Objective  | Year  |      |      |      |      |      |      |      |      |      |      |      |      |
|--|-------|------|------|------|------|------|------|------|------|------|------|------|------|
|  | <2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
| Streamflow Gaging: Three permanent stream gauges established. Data collected and analyzed annually |       |      | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |      |
| Stream and Riparian Habitat Surveys  | X     |      |      |      |      |      |      | X    |      |      |      | X    |      |
| Survey and map distribution of target species to verify effectiveness of fish passage improvements | X     |      |      |      |      |      |      | X    |      |      |      | X    |      |
| Maintain GIS map of lower Lake Creek conservation easements/projects.                              |       |      |      | X    |      | X    |      | X    |      | X    |      | X    |      |
| Establish and revisit photo points in restoration reference reaches.                               |       |      | X    |      | X    |      | X    |      | X    |      | X    |      | X    |
| 2007-2016. Conduct macro-invertebrate monitoring   |       |      |      | X    | TBD  | TBD  | TBD  | TBD  | TBD  | TBD  | TBD  | TBD  |      |
| Juvenile surveys for resident redband and bull trout   |       |      | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |      |
| Juvenile surveys for Chinook and steelhead   |       |      | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |      |
| Redd Count   |       |      |      |      | X    | X    | X    | X    | X    | X    | X    | X    |      |
| Outmigrant smolt trapping  |       |      | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |      |
| Document and tally new restoration partnerships and projects implemented on private lands          |       |      | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |      |
| Water quality monitoring   |       |      | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |      |
| Stream temperature monitoring  |       |      | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |      |
| Peer review by Independent Team  |       |      | X    |      |      | X    |      |      |      | X    |      |      |      |
| Brief Interim Update Report  |       |      |      | X    | X    |      | X    | X    |      | X    | X    | X    |      |
| Comprehensive, cumulative report   |       |      |      |      |      | X    |      |      | X    |      |      |      |      |
| Final Report   |       |      |      |      |      |      |      |      |      |      |      |      | X    |
| Meet with BEF and present results  |       |      | TBD  | TBD  | TBD  | TBD  | TBD  | TBD  | TBD  | TBD  | TBD  | TBD  | TBD  |

Proposed actions are contingent upon adequate funding and pledged support from PGE, CTWS, and ODFW biologists.

## Lower Crooked River 10-year Project Timeline and Projected Monitoring and Reporting Actions

| Project Objective  | Year    |      |      |      |      |      |      |      |      |      |      |      |      |
|--|---------|------|------|------|------|------|------|------|------|------|------|------|------|
|  | <2005   | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
| Establish and maintain permanent stream gages. Data collected and analyzed annually                  |         |      | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |      |
| Stream and Riparian Habitat Surveys  | Mckay   | X    |      |      |      |      | X    |      |      |      |      | X    |      |
|  | Ochoco  | X    |      |      |      |      |      |      |      |      |      |      | 2020 |
|  | Crooked | X    |      |      |      |      |      |      |      |      |      | X    | 2020 |
| Survey and map distribution of target species to verify effectiveness of fish passage improvements . | X       |      |      |      |      |      |      | X    |      |      |      | X    |      |
| Maintain GIS map of lower Lake Creek conservation easements/projects.                                |         |      |      | X    |      | X    |      | X    |      | X    |      | X    |      |
| Establish and revisit photo points in restoration reference reaches.                                 |         |      | X    |      | X    |      | X    |      | X    |      | X    |      | X    |
| 2007-2016. Conduct macro-invertebrate monitoring   |         |      |      | X    | TBD  | TBD  | TBD  | TBD  | TBD  | TBD  | TBD  | TBD  |      |
| Juvenile surveys for resident redband and bull trout   |         |      | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |      |
| Juvenile surveys for Chinook and steelhead   |         |      | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |      |
| Redd Count   |         |      |      |      | X    | X    | X    | X    | X    | X    | X    | X    |      |
| Outmigrant smolt trapping  |         |      | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |      |
| Document and tally new restoration partnerships and projects implemented on private lands            |         |      | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |      |
| Water quality monitoring   |         |      | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |      |
| Stream temperature monitoring  |         |      | X    | X    | X    | X    | X    | X    | X    | X    | X    | X    |      |
| Channel Cross-section surveys at reference reaches   |         |      | TBD  | TBD  | TBD  |      |      |      |      |      |      |      |      |
| Peer review by Independent Team  |         |      | X    |      |      | X    |      |      |      | X    |      |      |      |
| Brief Interim Update Report  |         |      |      | X    | X    |      | X    | X    |      | X    | X    | X    |      |
| Comprehensive, cumulative report   |         |      |      |      |      | X    |      |      | X    |      |      |      |      |
| Final Report   |         |      |      |      |      |      |      |      |      |      |      |      | X    |
| Meet with BEF and present results  |         |      | TBD  | TBD  | TBD  | TBD  | TBD  | TBD  | TBD  | TBD  | TBD  | TBD  | TBD  |

Proposed actions are contingent upon adequate funding and pledged support from PGE, CTWS, and ODFW biologists.

## Projected Monitoring and Reporting Actions

### Summary of BEF Reporting Criteria

#### Reporting criteria for interim updates and progress reports scheduled for years 2008, 2009, 2011, 2012, 2014, 2015, 2016:

Grantee agrees to submit to the Bonneville Environmental Foundation Model Watershed Interim reports at intervals specified above. At a minimum, reports will include the following information, and will be submitted by April 1<sup>st</sup> of stated year:

- A brief narrative summary (3-5 page) that provides:
  - a. An insightful evaluation of what was learned in the past year's work
  - b. A description of problems encountered and lessons learned
  - c. An insightful evaluation of whether the existing monitoring and evaluation actions appear sufficient to measure the cumulative effects of ongoing restoration actions
  - d. A discussion of whether the project appears to be on track to meet specified restoration objectives and benchmarks (this discussion should reference monitoring results or refer to observation and opinion if quantitative results are not yet conclusive or available)
  - e. A discussion of how (or if) future years' restoration and monitoring actions should/will be adjusted based on past results and lessons learned during previous years' activities.
- A description/list of tasks completed for the year, and a list of the restoration and monitoring tasks planned for the coming year (this will form a work plan). Ideally, these tasks would be listed along side (or within the body of) the 10-year restoration and monitoring matrix outlined above. This will allow BEF Board members to understand how the proposed actions fit within the context of the longer-term plans and restoration strategy. Annual work plans delivered to BEF will provide the basis for each new years' grant contract.
- A brief year end financial review of the project and/or program (Grantees should simply submit existing financial statements. No additional work should be invested in preparing this information for BEF)

- Raw data collected in the previous year (Note: this is a formality--grantee should simply copy data to a CD and include it with the annual report (if data are not already included in an annual report for other purposes). No attempt should be made to manipulate data or provide data in a particular format strictly for BEF)

**Comprehensive, Cumulative Reports:** These reports are intended to provide a cumulative perspective into project results measured to date; they occur roughly every 3-4 years. Although statistically significant trends may not be apparent, it is expected that the reports will display cumulative trends in the data collected for the project (including biological, chemical, physical parameters consistent with the objectives outlined in the matrix above). The report will be presented in a written format and may also be presented personally to BEF by grantees.

It is exceptionally important that this report discuss how watershed restoration strategies and actions will or will not be adjusted based on the analysis and lessons learned from the Cumulative Reports. The primary point of the Model Watershed approach is to facilitate and promote a results-based and adaptive approach to watershed restoration. The narrative aspect of this report should clearly describe how data analyses and results are facilitating institutional learning and adaptive program management.

BEF expects to arrange meetings with project sponsors to discuss project progress, results, and next steps throughout the course of the 10-year Model Watershed partnership.

**Final Report:** A final report will present data and results that address cumulative trends in physical, biological, and chemical conditions measured and/or documented over the 10-year project period. The report will also provide in depth perspective into institutional learning and the application of lessons learned over the 10-year period. The specific criteria and parameters for the final report will be agreed upon between BEF and the Grantee.