

MEMORANDUM OF UNDERSTANDING
Among the
MARIN MUNICIPAL WATER DISTRICT,
COUNTY OF MARIN,
MARIN COUNTY OPEN SPACE DISTRICT,
CALIFORNIA DEPARTMENT OF PARKS AND RECREATION,
NATIONAL PARK SERVICE, and
MARIN COUNTY RESOURCE CONSERVATION DISTRICT
For
WOODY DEBRIS MANAGEMENT
In RIPARIAN AREAS of the LAGUNITAS CREEK WATERSHED

Final: February 1, 2007

This Memorandum of Understanding, dated February 1, 2007, is by and between the Marin Municipal Water District (MMWD); the County of Marin (County), acting through the Marin County Board of Supervisors (Supervisors); the Marin County Open Space District; the California Department of Parks and Recreation (State Parks); the National Park Service (NPS); and the Marin County Resource Conservation District (MCRCD).

RECITALS

WHEREAS, the parties to this Memorandum of Understanding (hereafter “Agreement”) own, manage, or have an interest in the management of lands and waters within the 103-square mile Lagunitas Creek watershed, the largest watershed in Marin County; and

WHEREAS, the Lagunitas Creek watershed supports populations of threatened and endangered species listed under the federal and state Endangered Species Acts, including coho salmon, steelhead trout, California freshwater shrimp, and California red-legged frog; and

WHEREAS, the construction of roads, trails, structures and dams (including Peters Dam) and past practices of tree removal from the creek and its riparian areas, have reduced the amount of naturally occurring woody debris in Lagunitas Creek; and

WHEREAS, trees in the vicinity of creeks will, over time, be delivered to the stream channel under natural conditions; and

WHEREAS, the riparian forest provides shade and stream temperature control, increases streambank stability, provides opportunities for overhanging banks and cavities, enhances food production, and improves habitat complexity; and

WHEREAS, the riparian forest is the source of natural woody debris in the system for recruitment of woody debris into the stream channel; and

WHEREAS, woody debris creates and maintains beneficial instream habitat for coho and steelhead by increasing pools, providing cover and refuge, providing foraging sites, and providing flow diversity by varying water velocity and depth; and

WHEREAS, riparian vegetation and woody debris create and maintain beneficial instream habitat for California freshwater shrimp by extending roots into the water column which shrimp attach to and feed from and by creating deep water habitat along the shoreline which shrimp require; and

WHEREAS, all parties to this Agreement recognize that proper management of woody debris in riparian areas under their ownership, jurisdiction, or influence within the Lagunitas Creek watershed can enhance habitat for coho salmon, steelhead trout, and California freshwater shrimp; and

WHEREAS, it is the goal of all parties to this Agreement to enhance coho salmon, steelhead trout and California freshwater shrimp habitat within the Lagunitas Creek watershed, specifically focusing on salmon bearing streams, by supporting the self-sustaining natural recruitment of woody debris; and

WHEREAS, it is the intent of all parties to this Agreement to encourage a cooperative relationship among the parties to implement a consistent approach to the management of woody debris in riparian areas of the salmon bearing streams in the Lagunitas Creek watershed; and

WHEREAS, all parties to this Agreement acknowledge that implementation of this Agreement and its associated Best Management Practices should be supported and funded wherever possible as resources permit.

AGREEMENT

NOW, THEREFORE, the parties to this Agreement agree to:

1. Come to an understanding of the guidelines regarding the management and prioritization of naturally occurring woody debris and potential woody debris (i.e. standing trees), in riparian areas, for stream habitat enhancement, as outlined in the *Best Management Practices for Woody Debris in Riparian Areas of Salmon Bearing Streams in the Lagunitas Creek Watershed*.
2. Protect the natural source areas for future wood recruitment within riparian areas and, as resources permit, identify and undertake riparian reforestation projects needed to enhance habitat complexity.
3. Incorporate bioengineering techniques, such as the use of large woody debris and willow brush mattresses, into streambank stabilization structures in order to further promote the presence of wood in the channel and encourage a forested bank as a source of future recruitment.
4. Identify specific large and/or long-term woody debris enhancement projects on each agency's stretch of the creek that cannot be funded within each agency's annual budget.

5. Meet, at least annually, with all other agency project managers responsible for this woody debris MOU, as convened by MMWD, to develop strategies, and identify funding mechanisms, to accomplish specific large and/or long-term woody debris enhancement projects by means of phasing, sharing staff or equipment, and cooperative grant-seeking; for problem solving, idea sharing and potential project coordination to support natural woody debris recruitment through minimal intervention and natural riparian forest regeneration; to review existing, or consider new habitat complexity enhancement techniques; and to discuss other matters pertinent to fulfilling the goals of this Agreement. MMWD will provide a summary of this meeting to the Lagunitas Technical Advisory Committee that will include a compilation of any monitoring reports from or communication with the signatory agencies.
6. Meet, at least annually, among each agency's own maintenance staff responsible for woody debris management, as convened by each agency, for training, problem solving, and idea sharing to support natural woody debris recruitment through minimal intervention and natural riparian forest regeneration; to review existing, or consider new habitat complexity enhancement techniques; to review any monitoring reports; and discuss other matters pertinent to fulfilling the goals of this Agreement.
7. Support the transport by MMWD of large woody debris from above Peters Dam to Lagunitas Creek downstream of the dam in an effort to mitigate the effects of the dam on natural woody debris recruitment.
8. Support making woody debris available to other parties for use in biotechnical and other stream habitat enhancement projects within the Lagunitas Creek watershed.
9. Provide the other parties to this Agreement with on-going information relevant to woody debris management in riparian areas of the Lagunitas Creek watershed. This may include maps and data about individual sites, and training or other educational information.
10. Act consistently with this Agreement when developing policies, plans, or projects; when exercising regulatory authority or conducting environmental review; or when otherwise conducting work related to woody debris in the Lagunitas Creek watershed; and encourage others to do so.
11. Implement the actions in this Agreement in compliance with all applicable federal, state, and local environmental laws and regulations.
12. Acknowledge the fact that nothing in this Agreement negates any laws, regulations, or policies; including previous agreements related to woody debris management.
13. Recognize that the terms of this Agreement are subject to the availability of funding, personnel and other essential resources, and that each party has the sole authority and responsibility regarding decisions and matters in its own jurisdiction.

This Agreement has no termination date and may be revised as necessary. Each party to this Agreement may withdraw from this Agreement upon written notice to all other parties.

The parties agree that this Agreement does not constitute any legal admission or opinion as to the subject matter, nor does it confer any additional legal rights, liabilities or obligations between the parties or to third parties that do not already exist in law.

Marin Municipal Water District

County of Marin

President, Board of Directors
Attest:

President, Board of Supervisors
Attest:

California Department of Parks and Recreation

National Park Service

Superintendent, Marin District Parks
Attest:

Superintendent, Point Reyes NS
Attest:

Marin County Resource Conservation District

Marin County Open Space District

President, Board of Directors
Attest:

President, Board of Directors
Attest:

Best Management Practices for Woody Debris in Riparian Areas of Salmon Bearing Streams of the Lagunitas Creek Watershed Final: February 1, 2007

The natural recruitment of woody debris into a creek is a long-term and self-sustaining process which supports habitat diversity and species abundance. The best way to promote this process is to allow nature to take its course with minimal disturbance. That being stated, it is acknowledged that the lands of the Lagunitas Creek watershed serve purposes beyond the preservation of nature, including, but not limited to, residences, watershed protection and management for water supply, recreation, transportation, and agriculture.

The following best management practices are understood and agreed on by all parties to be used as guidelines for the development of a self-sustaining system for the natural recruitment and treatment of woody debris in coho bearing streams of the Lagunitas Creek watershed. For further information, please call one of the Marin Municipal Water District resource professionals listed in Appendix C.

PRIORITIZATION

The highest priority use for woody debris and potential woody debris (standing trees) in the riparian corridor is for stream habitat enhancement.

DEFINITIONS

Downed Wood - Any fallen tree or woody pieces of any size in one of the three Zones described below (includes Large Woody Debris, Small Woody Debris and Debris Jams).

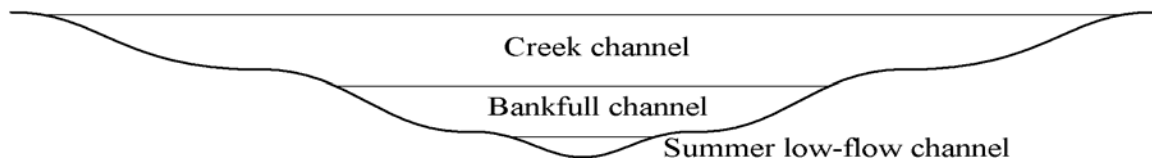
Large Woody Debris - downed wood in one of the three Zones described below that is:

- a) greater than 12 inches in diameter, at any point, and at least ten feet long including rootball, if attached; or
- b) of any size when attached to a rootball or stump greater than three feet in diameter.

Standing Trees - Live or dead trees in one of the three Zones described below (i.e. potential large woody debris).

ZONES

Creek Channel Zone - The area between the left and right banks of a creek including the wet channel, gravel bars, and vegetated islands. In many cases this is larger than what is traditionally known as the “bankfull” channel (see drawing).



Recruitment Zone – the area on either side of the creek channel which includes the floodplain (the area adjacent to the creek channel that could be inundated by high stream flows of any magnitude and transport woody debris into the creek) and extends 200 feet upslope beyond the floodplain. (See Appendix A for a general guide to the area in question.)

Kent Lake Zone –the area around Kent Lake where large woody debris can be collected for use as stream habitat enhancement.

BEST MANAGEMENT PRACTICES

The treatment of “Standing Trees,” “Downed Wood” and “Large Woody Debris” is here divided into four categories:

- 1) Standing Trees in the Recruitment Zone,
- 2) Downed Wood in the Recruitment Zone,
- 3) Wood in the Creek Channel, and
- 4) Wood in the Kent Lake Zone.

STANDING TREES IN THE RECRUITMENT ZONE:

Standing trees greater than six (6) inches diameter at breast height (DBH) for conifers and twelve (12) inches DBH for non-conifers, and within the recruitment zone as defined above, and including the uphill sides of roads and trails, should not be felled.

However, a standing tree of this size and in this zone may occasionally cause concern for safety because it is diseased or old. If so, a registered professional forester or similarly accredited professional should determine in writing that the tree poses an imminent threat to public safety and recommend a course of action. If such a tree must be cut, and is downhill from a road or trail, every effort should be made to fell it toward the creek and leave it as intact as possible. If such a tree is on the uphill side of a road or trail, it should be placed as intact as possible at a safe and accessible site until its usefulness as stream enhancement can be determined; if it is determined that the tree is not useful for this purpose, it shall be moved to the downslope side of the road/trail and released in a safe manner. If none of the above is possible, see “Unusual Situations and Emergencies.”

DOWNED WOOD IN THE RECRUITMENT ZONE

Downed wood, within the recruitment zone, should not be cut or moved.

However, downed wood in this zone may occasionally block access to a road or trail. If so, a step by step process to determine the best course of action should be followed:

- 1) Treat wood that is lying partly in the creek channel as ‘Wood in the Creek Channel’ which is discussed in the next section, or
- 2) Move wood, intact, out of the way and towards the creek, or
- 3) Cut the minimal number of branches to clear the obstruction, or
- 4) For trails, reroute the path around the wood, or
- 5) For trails, cut steps into the wood or construct steps over the wood to provide access.

If none of the above is a possible way forward, then see “Unusual Situations and Emergencies.”

WOOD IN THE CREEK CHANNEL

Any and all wood in the creek channel (standing trees, downed wood, large woody debris, small woody debris and debris jams) should not be cut or moved.

However, a piece of wood or a debris jam in the creek channel may occasionally cause concern for public facilities by way of threatening bank stability, public safety or obstruction of roads or

trails. If so, see “Unusual Situations and Emergencies.” Moving or removing such wood may require consultation with, or a permit from, the US Army Corps of Engineers, the SF Bay Regional Water Quality Control Board, and/or a Lake or Streambed Alteration Agreement from the California Department of Fish and Game.

WOOD IN THE KENT LAKE ZONE

Any and all wood in the Kent Lake Zone should be assessed for its potential as large woody debris, which should be prioritized for stream habitat enhancement using above guidelines modified to facilitate transport.

UNUSUAL SITUATIONS AND EMERGENCIES

Any discrepancy between the Woody Debris MOU, including these Best Management Practices, and an agency’s preferred plan of action should be resolved through the following steps:

- 1) Identify the problem and its urgency;
- 2) If the problem is an immediate emergency or professional consultation is unavailable (see #3) before the problem is likely to become an immediate emergency, then follow the Fish4C guidelines (Appendix B); if otherwise, then
- 3) Call for a team of appropriately qualified professionals (Appendix C), consisting of a minimum of at least one individual from each of at least two signatory or resource agencies to make a recommendation.
- 4) Clarify the plan of action.
- 5) Document the problem, consultation (if any) and course of action taken.
- 6) Contact the MMWD Fisheries Department at (415) 945-1193 and provide the following information: the size and type of log relocated, presence of a rootball, and final location of log.

FURTHER READING

The Ecology and Management of Wood in World Rivers, eds. Gregory, Boyer and Gurnell. This book is a collection of papers on the importance, function and management of wood in rivers and the riparian corridor. MMWD Fisheries Department has a copy of this book.

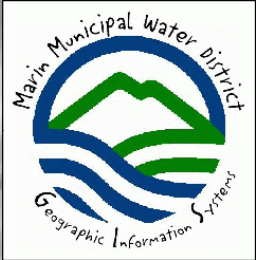
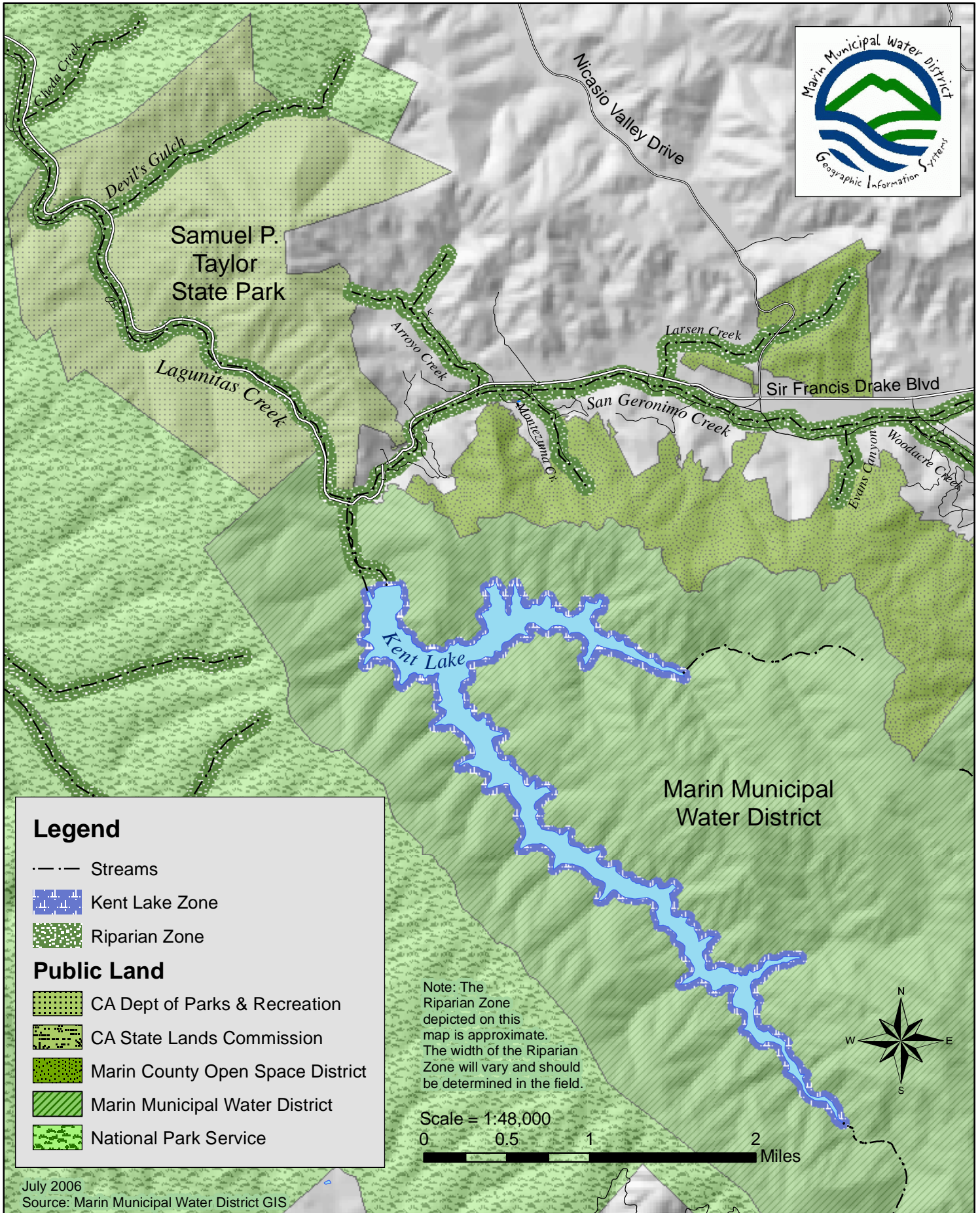
Guidelines for Protecting Aquatic Habitat and Salmon Fisheries for County Road Maintenance (Dec 2004). FishNet4C. This document has a section on woody debris with accompanying best management practices for creeks alongside roads. It can be downloaded at:

http://www.fishnet4c.org/projects_roads_manual.html

APPENDIX A

Maps of the Lagunitas Creek Watershed

Kent Lake Zone and Riparian Zone of Coho Bearing Streams - Lagunitas Creek Woody Debris MOU -



Legend

- Streams
- [Light Blue Box] Kent Lake Zone
- [Green Dotted Box] Riparian Zone

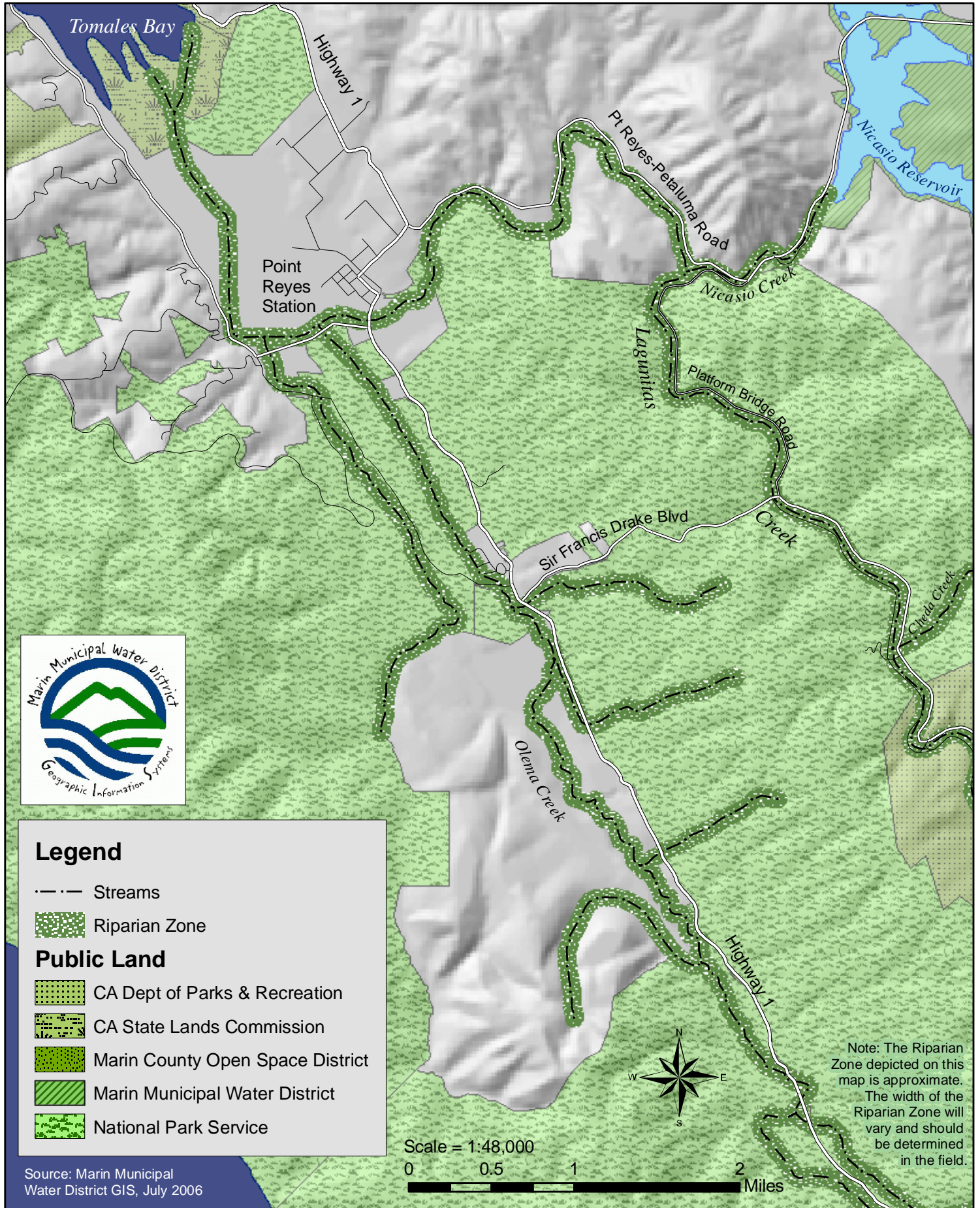
Public Land

- [Green Dotted Box] CA Dept of Parks & Recreation
- [Green Dotted Box] CA State Lands Commission
- [Green Dotted Box] Marin County Open Space District
- [Green Diagonal Lines Box] Marin Municipal Water District
- [Green Dotted Box] National Park Service

Note: The Riparian Zone depicted on this map is approximate. The width of the Riparian Zone will vary and should be determined in the field.

Scale = 1:48,000
0 0.5 1 2 Miles

Riparian Zone of Coho Bearing Streams - Lagunitas Creek Woody Debris MOU -



Legend

- Streams
- Riparian Zone

Public Land

- CA Dept of Parks & Recreation
- CA State Lands Commission
- Marin County Open Space District
- Marin Municipal Water District
- National Park Service

Source: Marin Municipal Water District GIS, July 2006

Scale = 1:48,000

0 0.5 1 2 Miles



Note: The Riparian Zone depicted on this map is approximate. The width of the Riparian Zone will vary and should be determined in the field.

APPENDIX B

FishNet4C Guidelines for Managing Woody Debris

6.3 WOODY DEBRIS

DESCRIPTION

A healthy salmon stream is chock full of large wood- big logs and rootwads, that dig into the banks and help form the channel's complexity.- making pools and providing food and shelter. Wood is a key link in the ecosystem of salmon. Restorationists and public agencies have taken on the task of placing large woody debris structures into creeks to benefit salmon. While restoration certainly helps, *our goal in this section is to provide guidelines on how to keep wood in the creek in the first place.*

Large Woody Debris (LWD), is defined as stumps, rootwads and logs having an average diameter greater than 6 inches and a length greater than 10 feet. When we refer to woody debris management it is best to think about *modification*, rather than removal, whenever feasible. Removal of wood from creeks has such a negative impact on salmon, that as a general practice, it should not be done unless there is a very real threat to county property or public safety. Best Management practices outlined below will help guide crews in avoiding or minimizing this impact.

One of the very best ways to allow wood to stay in the creek is to maintain culverts and bridges that pass the 100-year flood flows. This ensures that large debris flows will also pass, creating more natural channel conditions overall. See *6.2 Culvert Cleaning, Repair and Replacement*.

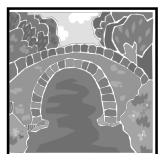
Note: The maintenance practices covered in this section *do not* include traditional channel maintenance or flood control activities. For information on flood control or channel maintenance BMPs, please refer to [Flood Control Facility Maintenance Manual](#) developed by the Bay Area Stormwater Management Agencies Association (BASMAA, June 2000).

ENVIRONMENTAL CONCERNS

- ✓ Loss of instream habitat due to wood removal.
- ✓ Harm to instream aquatic habitat or aquatic species.
- ✓ Harm to riparian areas and riparian species.
- ✓ Alteration of natural channel function or shape or destabilization of stream banks.
- ✓ Water pollution from equipment operation.
- ✓ Alteration of stream hydraulics and diversion of stream energies that may cause downstream erosion or structural damage.

BMP OBJECTIVES

- ✓ Preserve and protect important woody debris in creeks to the extent possible.
- ✓ Prevent potential water pollution from equipment operations.



BEST MANAGEMENT PRACTICES

- 1) Only remove (as opposed to modify) logs and debris from streams as a “last resort” when accumulation of debris poses a threat to road stability and bridges, culverts or other instream structures.
- 2) Have both a biologist and an engineer conduct a full review of the situation. The biologist should be familiar with the life histories and habitat needs of federally listed plants and animals in the area and be able to identify any of the life stages of these species. If in doubt as to the best way to handle large woody debris in a stream, consult with DFG personnel.
- 3) If log jams immediately threaten, or are damaging the integrity of roads, bridges, other public facilities during high flows, consider opportunities to *modify* the debris jam to halt damage and direct flow toward a more desirable path.
- 4) Take precautions to ensure that modifications of logs or debris jams will not cause damage downstream to culverts and other structures.
- 5) Limit modifications and/or removal to materials that extend higher than approximately two feet above the streambed (i.e. above knee height) to preserve some instream habitat features, *unless* the log or debris jam is immediately upstream and threatening a culvert or bridge, or if permit conditions require otherwise.
- 6) When modifying log jams, leave trees, logs and/or stumps in the longest lengths and diameters practicable for removal and hauling. If logs must be cut from fallen trees, leave as much as possible of the main trunk (12 feet plus is desirable) attached to the rootball and only cut branches obstructing flow. Log jams create suitable habitat for California red-legged frogs and San Francisco garter snakes and so where applicable this should be considered before removing or modifying any logjams.
- 7) Whenever feasible, incorporate LWD removed from water bodies into streambank repairs or cribbing at a nearby location, and/or transport any removed LWD to an approved storage site and make available for later use (e.g. in stream restoration activities).

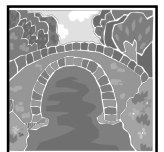
BMP TOOLBOX

Planning and Prevention BMPs

- ✓ Seasonal Planning

PERMITS

6.3 WOODY DEBRIS	
Activity or Condition	Required permit or limitation
Removing or modifying large woody debris	Consult with DFG biologists



APPENDIX C

Professional Resource Contacts

Marin Municipal Water District

Eric Ettliger, Aquatic Ecologist	(415) 945-1193
Gregory Andrew, Fishery Program Manager	(415) 945-1191
Michael Swezy, Resource Specialist	(415) 945-1190

County of Marin

Liz Lewis, Stormwater Program Administrator	(415) 499-7226
Kallie Kull, Senior Planner	(415) 499-6532

California Department of Parks and Recreation

Dave Boyd, State Park Resource Ecologist	(707) 769-5665 x223
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National Park Service

Brannon Ketcham, Hydrologist	(415) 663-8522
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San Francisco Bay Regional Water Quality Control Board

Leslie Ferguson, Civil Engineer	(510) 622-2344
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California Department of Fish and Game

Bill Cox, Fisheries Biologist	(707) 823-1001
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