

# Appendix G: Intrinsic Potential Updates

## INTRINSIC POTENTIAL

The number of kilometers of habitat with Intrinsic Potential (IP-km) was updated from values provided by Bjorkstedt *et al.* (2005) and Spence *et al.* (2012). The revisions were conducted for three reasons: (1) to account for natural barriers not detected during model development (*e.g.*, water falls, excessive steep gradients); (2) to eliminate incorrect hydrologic pathways created during IP development (*e.g.*, non-existent flow paths in low gradient areas); and (3) to identify where current conditions are unsuitable and/or irretrievable as determined by the NCCO recovery team. Some of the revisions were in response to comments and information provided to NMFS by Co-managers and Statement of Understanding (SOU) partners.

In 2011 and 2014, drafts of the Coastal Multispecies Recovery Plan were provided to Co-Managers and SOU partners for review and comment. From the 2011 review, NMFS received several comments regarding the extent of IP for steelhead and the density-based adult abundance targets. In response to these comments, the SWFSC revised the model used to derive the IP for steelhead (NC and CCC DPSs), which resulted in changes to the amount of IP-km for steelhead. This process was described by Spence *et al.* (2012).

## NATURAL BARRIERS AND INCORRECT HYDROLOGY

Following the 2012 revision of steelhead IP by the SWFSC, staff at the NMFS NCCO reviewed each population for the occurrence of IP-km that extended beyond the natural limits of anadromy. This exercise was done in GIS and utilized only the natural, total barriers within the California Department of Fish and Wildlife's (CDFW) Passage Assessment Database (PAD). In most cases, IP reaches upstream of natural barriers were removed from the historic IP. In addition, the original IP network included incorrect (or unnatural) hydrologic pathways (*i.e.*, stream or river paths that did not exist historically or currently). Such reaches were especially apparent in low gradient valley floor and tidal sections of the watersheds. The incorrect pathways were removed from the historic IP. Removal of these reaches often results in broken segments within the IP-km shown in the individual maps.

In May 2014, a second draft of the plan was distributed to the Co-managers and SOU partners for review and comment. While addressing comments, additional occurrences where IP-km extended upstream of natural barriers were found. A second review of each population was conducted and IP-km found upstream of natural total barriers were removed from historic IP. When available, other sources of information (*e.g.*, fish passage assessments, CDFW habitat typing reports, and photographs) were also reviewed prior to making final determinations.

Both Bjorkstedt *et al.* (2005) and Spence *et al.* (2012) indicate the IP networks do not account for the productive estuarine habitats when estimating steelhead productivity within populations. In coastal streams, the IP-kms through estuarine habitats (including bar-built lagoons) had substantially fewer incorrect pathways than populations that drained through the tidal portions of San Francisco Bay, and were therefore left intact. However, for San Francisco Bay populations, the IP contained extensive incorrect, unnatural pathways that did not reflect historic or current conditions, or in some cases did not reach the Bay at all. For consistency, all estuarine reaches will be removed from the historic IP to the upstream extent of tidal influence.

## **INTRINSIC POTENTIAL AND SEVERE BIAS**

From the 2014 Co-manager and SOU partner review, NMFS received additional comments regarding the extent of IP below natural barriers and population spawner abundance targets. While the revisions to IP made by the SWFSC in 2012 reduced the extent of IP considerably, reviewers of the plan identified extensive areas of IP-km that were not likely to have provided suitable habitat conditions for steelhead spawning or rearing both historically and currently. As with the 2011 draft, a vast majority of these comments pertained to populations tributary to San Francisco Bay and those identified as having a severe IP bias by Bjorkstedt *et al.* (2005) and in Spence *et al.* (2008).

Data on the historic and current presence of steelhead, stream flow duration, and the suitability of habitat conditions for steelhead in these populations are limited to primarily anecdotal accounts and limited juvenile sampling. Due to the paucity of empirical data, NMFS staff invited regional experts from our Co-managers and SOU partners to review and provide comments on the extent of IP in the severely biased, essential independent populations of the two San Francisco Bay Diversity Strata.

Using data or their best professional judgement, the experts were asked to identify reaches that were likely to have supported steelhead historically, and those that had a reasonable likelihood of functioning as spawning and/or rearing habitat into the future; this would include reaches currently impaired but that could be enhanced through reasonable restoration efforts. The focus of these meetings was to discern existing and, where possible, historic hydrology (precipitation, surface flow duration, water temperature), gradient, substrate, and vegetation communities as well as steelhead distribution (presence/absence) and relative abundance of steelhead.

The comments provided by the regional experts were reviewed by NMFS and where consensus was met stream reaches unlikely to support spawning or rearing (*e.g.*, highly ephemeral reaches, or highly modified and irretrievable reaches) are to retain the classification of IP, but are not included in the development of the density-based abundance targets. In addition, reaches currently inundated by large reservoirs were omitted since these reaches are no longer suitable spawning habitat and because most reservoirs represent poor rearing habitat (*i.e.*, poor water quality conditions, abundant predators, and poor access to downstream reaches). All remaining historic IP reaches will be considered viable habitat used to generate the density-based abundance criteria.

## **ASSESSMENT OF DAMS**

In general, IP-km upstream of large impassable dams were removed from consideration in most populations. However, for populations within the two San Francisco Bay diversity strata, the currently accessible IP-km would not yield the density-based abundance targets required to meet the minimum biological viability criteria in Spence *et al.* (2008) and Spence *et al.* (2012). Beginning in 2011, NMFS conducted an assessment of existing dams in these two Diversity Strata to identify populations where passage above dams for adult steelhead would be necessary to meet the biological viability criteria. NMFS considered the following: (1) the quantity and quality of IP-km existing above the dams; (2) the role of the population within the Diversity Stratum (*i.e.*, independent or dependent populations and proximity to other nearby watersheds); and (3) the feasibility of passage relative to the extent and quality of IP-km upstream.

For populations outside of the San Francisco Bay Diversity Strata, a few select dams were identified as candidates to investigate feasibility for fish passage in the future. These dams were selected based

on the extent and quality of habitat upstream. All dams where fish passage is either required to meet the biological viability criteria (San Francisco Bay populations), or where future feasibility studies may be warranted are identified in Tables 1, 2, and 3 (see column “With Passage Above Dams”).

Tables 1, 2 and 3 below provide the historic IP-km (as identified by Spence *et al.*, 2012), subsequent revisions to the IP-km, including brief rationale for the changes. Population-specific details are provided in the individual profiles for each ESU/DPS. Table 3 includes the subset of IP-km for the severely biased essential populations of the two San Francisco Bay Diversity Strata that will be used to generate the density-based abundance targets.

Table 1: Population-specific changes to IP-km and areas above dams included in the CC Chinook Salmon ESU. Numbers in bold font were used to calculate spawner abundance target.

Diversity Stratum	Population	Historical IP-km (Spence et al. (2012))	Revised Historical IP-km	Current IP-km	IP-km With Passage Above Dams	Notes on Revision to CC Chinook salmon IP-km
<b>North Coastal</b>	Redwood Creek	116.1		<b>116.1</b>		
	Little River	18.6	17.4	<b>17.4</b>		1.2 IP-km removed above a natural barrier
	Mad River	94		<b>94</b>		
	Humboldt Bay Tributaries	76.7	76.0	<b>76.0</b>		0.7 IP-km removed above natural barrier
	Lower Eel River – Lower Mainstem/South Fork Eel River	371.2	364.8	<b>364.8</b>		6.4 IP-km removed above natural barriers
	Bear River	39.4		<b>39.4</b>		
	Mattole River	177.5		<b>177.5</b>		
<b>North Mountain Interior</b>	Upper Eel River	555.9	532.5	472.6	<b>521.4</b>	23.4 IP-km removed above a natural barrier; 59.9 IP-km above Scott Dam currently inaccessible, Plan is asking for Passage (11.1 IP-km under the reservoir not considered habitat)
	Van Duzen River/Larabee Creek	143.7		<b>143.7</b>		
<b>North-central Coastal</b>	Ten Mile River	67.2		<b>67.2</b>		
	Noyo River	62.2		<b>62.2</b>		
	Big River	104.3		<b>104.3</b>		
	Albion River	17.6		<b>17.6</b>		

<b>Central Coastal</b>	Navarro River	131.5		<b>131.5</b>		
	Garcia River	56.2		<b>56.2</b>		
	Gualala River	175.6		<b>175.6</b>		
	Russian River	584.2	577.2	<b>466.1</b>		0.5 IP-km removed above a natural barrier; 54.1 IP-km removed above Warm Springs Dam; 32.3 IP-km removed above Coyote Valley Dam; 1.1 IP-km removed above Matanzas Creek Dam; 23.6 IP-km removed as not viable habitat; 6.5 IP-km removed due to incorrect hydrologic modeling

Table 2: Population-specific changes to IP-km and areas above dams included in the NC steelhead DPS. Numbers in bold font were used to calculate spawner abundance target.

Diversity Stratum	Population	Historical IP-km (Spence et al. (2012))	Revised Historical IP-km	Current IP-km	IP-km With Passage Above Dams	Notes on Revision to NC steelhead IP-km
<b>Northern Coastal</b>	Redwood Creek (Lower)	183.7	161.5	<b>161.5</b>		22.2 IP-km removed above natural barriers
	Maple Creek / Big Lagoon	71.7		<b>71.7</b>		
	Little River	63	50	<b>50</b>		13 IP-km removed above a natural barrier
	Mad River (Lower)	148.3	145.7	<b>145.7</b>		2.5 IP-km removed above natural barriers
	Humboldt Bay Tributaries	212.1	203.4	<b>203.4</b>		8.7 IP-km removed above natural barriers
	Lower Mainstem Eel River Tributaries	166.9		<b>166.9</b>		
	Howe Creek	13.9		<b>13.9</b>		
	South Fork Eel River	1017	951.8	<b>951.8</b>		65.2 IP-km removed above natural barriers
	Guthrie Creek	9.2		<b>9.2</b>		
	Oil Creek	10.6		<b>10.6</b>		

	Bear River	107.8		<b>107.8</b>		
	McNutt Gulch	11.3		<b>11.3</b>		
	Mattole River	541.1	534.5	<b>534.5</b>		6.6 IP-km removed above 2 natural barriers
	Spanish Creek	1.9		<b>1.9</b>		
	Big Creek	3.8		<b>3.8</b>		
	Big Flat Creek	5.9		<b>5.9</b>		
	Shipman Creek	2.3		<b>2.3</b>		
	Telegraph Creek	5.3		<b>5.3</b>		
	Jackass Creek	7.6	6.9	<b>6.9</b>		0.7 IP-km removed above 2 natural barriers
<b>Lower Interior</b>	Jewett Creek	16.8		<b>16.8</b>		
	Chamise Creek	36.2		<b>36.2</b>		
	Bell Springs Creek	18.1		<b>18.1</b>		
	Woodman Creek	35		<b>35</b>		
	Outlet Creek	192.6	192.2	176.0	<b>188.8</b>	0.4 IP-km removed above natural barriers; 0.9 IP-km removed above Lake Ada Rose Dam; 0.5 IP-km removed above Chinguapin Dam; 0.6 removed as not viable habitat; 7.4 IP-km above Morris Dam currently inaccessible, Plan is asking for Passage (0.9 IP-km under the reservoir not considered habitat); 6.8 IP-km above Brooktrails Dam currently inaccessible, Plan is asking for Passage (0.5 IP-km under the reservoir not considered habitat)
	Garcia Creek	14.4		<b>14.1</b>		
	Tomki Creek	90.8	89.5	<b>89.5</b>		1.3 IP-km removed above natural barrier

	Bucknell Creek	19.1	9	<b>9</b>		10.1 IP-km removed above natural barrier
	Soda Creek	15.7		<b>15.7</b>		
<b>North Mountain Interior</b>	Redwood Creek (Upper)	87.2	85.7	<b>85.7</b>		1.5 IP-km removed above natural barriers
	Mad River (Upper)	305.6	303.8	<b>303.8</b>		1.8 IP-km removed above natural barriers
	Van Duzen River	317.4	312.2	<b>312.2</b>		5.2 IP-km removed above natural barriers
	Larabee Creek	88.4	86.6	<b>86.6</b>		1.8 IP-km removed above natural barrier
	Dobbyn Creek	49.1	47	<b>47</b>		2.1 IP-km removed above natural barrier
	North Fork Eel River	318.2	317	<b>317</b>		1.2 IP-km removed above natural barrier
	Middle Fork Eel River	503.5	474.2	<b>472.4</b>		29.3 IP-km removed above natural barriers; 1.8 IP-km removed above Williams Valley Dam
	Upper Mainstem Eel River	333.6	219.4	1.5	<b>209.2</b>	114.2 IP-km removed above natural barrier; 217.9 above Scott Dam currently inaccessible, Plan is asking for Passage (10.2 IP-km under the reservoir not considered habitat)
<b>North-central Coastal</b>	Usal Creek	29.1	27.5	<b>27.5</b>		1.6 IP-km removed above natural barriers
	Cottaneva Creek	23.2	21.9	<b>21.9</b>		1.3 IP-km removed above natural barriers
	Wages Creek	17.7	17.4	<b>17.3</b>		0.3 IP-km removed above natural barrier
	Ten Mile River	181.3		<b>171.0</b>		10.3 IP-km removed as non-viable habitat (streams dry)
	Pudding Creek	24.1		<b>24.1</b>		
	Noyo River	157.6	153.7	<b>152.8</b>		3.8 IP-km removed above natural barriers; 0.9 IP-km removed above McGuire Dam
	Caspar Creek	12.9		<b>12.9</b>		
	Big River	256.1	255	<b>255</b>		1.1 IP-km removed above natural barriers

	Albion River	48.6		<b>48.6</b>		
<b>Central Coastal</b>	Navarro River	397.9	387.6	<b>387.5</b>		8.8 IP-km removed above natural barriers; 1.6 IP-km removed as non-viable habitat(land is now developed)
	Elk Creek	21.5		<b>21.5</b>		
	Brush Creek	23.8		<b>23.8</b>		
	Garcia River	137.2		<b>135.4</b>		1.8 IP-km removed above natural barrier
	Schooner Gulch	7.7		<b>7.7</b>		
	Gualala River	400.3	396.8	<b>397.1</b>		3.5 IP-km removed above natural barriers; 0.7 IP-km added in as Hose Creek Dam has been removed; 0.4 IP-km removed above Richardson Dam

**Table 3: Population-specific changes to IP-km and areas above dams included in the recovery plan for the CCC Steelhead DPS. Numbers in bold font were used to calculate spawner abundance target.**

Diversity Stratum	Population	Historical IP-km (Spence et al. (2012))	Revised Historical IP-km	Current IP-km	IP-km With Passage Above Dams	Viable Habitat (Co-manager /SOU Review) IP-km	Notes on Revision to CCC steelhead IP-km
<b>North Coastal</b>	Willow Creek	8.2		<b>8.2</b>			
	Sheephouse Creek	3.7		<b>3.7</b>			
	Freezeout Creek	1.2		<b>1.2</b>			
	Austin Creek	95.4	95.1	<b>95.1</b>			0.3 IP-km removed above natural barrier
	Dutch Bill Creek	13.2		<b>13.2</b>			

	Green Valley Creek	37.1		<b>37.1</b>			
	Hulbert Creek	10.2		<b>10.2</b>			
	Porter Creek	10.3		<b>10.3</b>			
	Salmon Creek	36.6	33.6	<b>33.6</b>			3 IP-km removed above natural barriers
	Estero Americano	35.4		<b>35.4</b>			
	Walker Creek	77.1		54.2	<b>73.3</b>		3.7 IP-km removed above Lake Laguna; 19.2 IP-km above Souljule Dam currently inaccessible, Plan is asking for Passage (1.1 IP-km under the reservoir not considered habitat)
	Lagunitas Creek	110.1		53.6	<b>85.0</b>		0.2 IP-km removed above natural barrier; 11.2 IP-km removed above Kent Dam; 4.6 IP-km removed above Alpine Dam; 1.1 IP-km removed above Bon Tempe Dam; 1.3 IP-km removed above Lagunitas Dam; 0.2 IP-km removed above Hagmaier Dam; 37.9 IP-km above Nicasio Dam currently inaccessible, Plan is asking for Passage (6.5 IP-km under the reservoir not considered habitat)
	Drakes Bay Tributaries	NA					
	Pine Gulch	9.7		<b>9.7</b>			
	Redwood Creek	6.7		<b>6.7</b>			
<b>Interior</b>	Mark West Creek	286.8	281.2	<b>164.2</b>			5.6 IP-km removed above natural barriers; 1.7 IP-km removed above Piner Dam; 12.1 IP-km removed above Mantanzas Creek Dam; 1.3 IP-km removed above Alpine Creek Dam; 0.2 IP-km removed above unnamed dam; 101.7 IP-km removed as not viable habitat
	Dry Creek	282.2		<b>115.9</b>			165.7 IP-km removed above Warm Springs Dam; 0.6 IP-km removed above Merlo Dam
	Maacama Creek	77.1		<b>76.2</b>			0.9 IP-km removed above Mallacomes Dam

	Sausal Creek	12.0	11.1	<b>11.1</b>			0.9 IP-km removed above natural barrier
	Miller Creek	7.8	3.1	<b>3.1</b>			1.3 IP-km removed above natural barrier; 3.4 IP-km removed due to incorrect hydrologic modeling
	Gill Creek	8.3	8.1	<b>8.1</b>			0.2 IP-km removed as stream dries
	Crocker Creek	4.7	4.5	<b>4.5</b>			0.2 IP-km removed above natural barrier
	Upper Russian River	679.0	635.7	<b>422.9</b>			43.3 IP-km removed above natural barriers; 119.7 IP-km removed above Coyote Valley Dam; 93.1 IP-km removed as not viable habitat
<b>Coastal San Francisco Bay</b>	Arroyo Corte Madera del Presidio	7.0		<b>6.9</b>			0.1 IP-km removed above Cascade Dam
	Corte Madera Creek	26.4	25.6	21.5	<b>22.8</b>		0.8 IP-km removed above natural barrier; 2.3 IP-km removed as not viable habitat; 1.3 IP-km above Phoenix Lake Dam currently inaccessible, Plan is asking for Passage (0.5 IP-km under the reservoir not considered habitat)
	Miller Creek	11.2		<b>11.2</b>			
	Novato Creek	48.9		24.5	33.1	<b>28.7</b>	14.6 IP-km removed as not viable habitat; 9.8 IP-km above Stafford Dam currently inaccessible, Plan is asking for Passage (1.2 IP-km under the reservoir not considered habitat); 1.5 IP-km removed as not viable habitat (SOU); 9 IP-km removed as not viable habitat (Tidal) (SOU); 6.1 IP-km added back as viable habitat (SOU)
	Guadalupe River	113.1	111.1	43.1	57.4	<b>50.8</b>	40 IP-km removed as not viable habitat; 2.2 IP-km removed above Calero Reservoir; 0.3 IP-km removed above Almaden Valley Dam; 8.3 IP-km removed above Camden Drop Structure; 2 IP-km removed due to incorrect hydrologic modeling; 12.1 IP-km above Almaden Reservoir Dam currently inaccessible, Plan is asking for Passage (1.9 IP-km under the reservoir not considered habitat); 5.1 IP-km above Guadalupe Reservoir Dam currently inaccessible, Plan is asking for

							Passage (1 IP-km under the reservoir not considered habitat); 6.7 IP-km removed as not viable habitat (Tidal) (SOU); 0.7 IP-km removed as not viable habitat (SOU); 0.9 IP-km added back as viable habitat (SOU)
	Stevens Creek	31.4	27.3	10.6	26.1	<b>22.9</b>	4.1 IP-km removed due to incorrect hydrologic modeling; 16.7 IP-km above Stevens Creek Dam currently inaccessible, Plan is asking for Passage (1.2 IP-km under the reservoir not considered habitat); 3.1 IP-km removed as not viable habitat (SOU)
	San Francisquito Creek	43.3	41.9	22.6	36.6	<b>35.6</b>	1.4 IP-km removed above natural barrier; 1.7 IP-km removed as not viable habitat; 3.1 IP-km above Bear Gulch barrier; 14.5 IP-km above Searsville Dam currently inaccessible, Plan is asking for Passage (0.5 IP-km under the reservoir not considered habitat); 1 IP-km removed as not viable habitat (SOU)
	San Mateo Creek	33.3		<b>7.6</b>			25.7 IP-km removed above Crystal Springs Dam
<b>Interior San Francisco Bay</b>	Petaluma River	148.5	142.3	<b>64.9</b>			0.3 IP-km removed above natural barrier; 5.7 IP-km removed due to incorrect hydrologic modeling; 22.4 IP-km removed as it is tidal; 0.4 IP-km removed above Pinheiro Dam; 0.3 IP-km removed above Vonsen Dam; 54.3 removed as not viable habitat
	Sonoma Creek	198.1	185.5	<b>137.8</b>			6.2 IP-km removed above natural barriers; 6.4 IP-km removed due to incorrect hydrologic modeling; 47.7 IP-km removed as not viable habitat;
	Napa River	426.2	402.2	230.2	283.4	<b>246.7</b>	2 IP-km removed above natural barrier; 22 IP-km removed due to incorrect hydrologic modeling; 110 IP-km removed as not viable habitat; 1.4 IP-km removed above Bell Canyon Dam; 1.9 IP-km removed above Kimball Creek Dam; 55.4 IP-km above Conn Dam currently inaccessible, Plan is asking for Passage (4.7 IP-km under the reservoir not considered habitat); 3.4 IP-km above York

							Dam currently inaccessible, Plan is asking for Passage; 15.2 removed as not viable habitat (SOU); 7.6 IP-km removed due to incorrect hydrologic modeling (SOU); 14.8 IP-km removed above natural barrier (SOU)
	Green Valley / Suisun Creek	99.3		82.4		<b>56.2</b>	15.7 IP-km removed above Lake Curry Dam; 1.2 IP-km removed above Wooden Valley Dam; 26.2 IP-km removed as not viable habitat (Tidal) (SOU)
	Pinole Creek	NA					
	San Pablo Creek	29.1	28.5	<b>10.1</b>			0.6 IP-km removed above natural barrier; 18.4 IP km above San Pablo Reservoir
	Wildcat Creek	NA					
	Codornices Creek	NA					
	San Leandro Creek	44.0		<b>6.2</b>			23.6 IP-km removed above San Leandro Dam; 8.5 IP-km removed between Chabot Dam and San Leandro Dam; 5.7 IP-km removed as not viable habitat
	San Lorenzo Creek	40.8		<b>18.1</b>			10.6 IP-km removed above Don Castro Dam; 5.8 IP-km removed above Cull Creek Dam; 6.3 IP-km removed as not viable habitat
	Alameda Creek	432.0	370.9	133.2	188.5	<b>108.3</b>	61.1 IP-km removed above natural barrier; 85.8 IP-km removed above Del Valle Dam; 85.4 removed at not viable habitat; 21.9 IP-km above ACDD currently inaccessible, Plan is asking for Passage; 16.4 IP-km above Calaveras Dam currently inaccessible, Plan is asking for Passage; 28.2 IP-km above San Antonio Dam currently inaccessible, Plan is asking for Passage; 91.4 IP-km removed as not viable habitat by SOU partners
	Coyote Creek	286.6	276.5	32.8	169.3	<b>109.3</b>	10.1 IP-km removed as never was historical habitat; 98.3 IP-km removed as not viable habitat; 92 IP-km above Coyote Dam currently inaccessible, Plan is asking for Passage (3 IP-km under the reservoir not considered habitat); 53.4 IP-km above Anderson Dam currently

							inaccessible, Plan is asking for Passage (6 IP-km under the reservoir not considered habitat); 48.3 IP-km removed as not viable habitat (SOU); 11.7 IP-km removed as not viable habitat (Tidal) (SOU)
<b>Santa Cruz Mountains</b>	San Pedro Creek	NA					
	Pilarcitos Creek	28.9	28.5	<b>28.5</b>			0.4 IP-km removed above natural barrier
	Tunitas Creek	10.8	10.7	<b>10.7</b>			0.1 IP-km removed above natural barrier
	San Gregorio Creek	55.2	46.6	<b>46.6</b>			8.6 IP-km removed above 4 natural barriers
	Pescadero Creek	66.4	66.1	<b>66.1</b>			0.3 IP-km removed above natural barrier
	Gazos Creek	13.2	12.5	<b>12.5</b>			0.7 IP-km removed above 2 natural barriers
	Waddell Creek	13.7	10.8	<b>10.8</b>			2.9 IP-km removed above natural barriers
	Scott Creek	18.9	16.4	<b>16.4</b>			2.5 IP-km removed above 2 natural barriers
	San Vicente Creek	6.2		<b>5.7</b>			0.5 IP-Km removed above Mining Tunnel and Diversion Dam
	Laguna Creek	13.1	4.5	<b>4.5</b>			8.6 IP-km removed above 2 natural barriers
	San Lorenzo River	161.5	154.6	<b>146.2</b>			6.9 IP-km removed above natural barriers; 8.4 IP-km removed above Loch Lomond Dam
	Soquel Creek	54.2	52.0	<b>52.0</b>			2.2 IP-km removed above natural barrier
	Aptos Creek	29.7	25.1	<b>25.1</b>			4.6 IP-km removed above 3 natural barriers