Owyhee Subbasin Plan

Appendix 2 – for the Technical Assessment (Chapter 2)

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2.2 Appendix 2. Raw scores for eleven habitat attributes in the "current" worksheet of the Qualitative Habitat Assessment (QHA) model – for the Idaho, Nevada and Oregon portions of the Owyhee Subbasin.

Appendix Table 2.2.1 QHA scores for the Idaho portion of the Owyhee Subbasin.

4th Field HUC/ Reach Name	Description	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	1
HUC 17050108													
Jordan Cr.-1	Jordan Cr. From OR Boundary to BLM boundary section	1.0	1.0	1.0	2.0	3.0	1.0	1.0	1.0	1.0	1.0	4.0	0
Jordan Cr.-2	From end of #2 to Rail Creek	1.5	2.0	1.0	2.0	2.5	2.0	2.5	2.0	2.0	1.0	4.0	1
Jordan Cr.-3	Rail Cr. Confluence to BLM boundary	2.0	2.0	2.0	3.0	3.0	1.0	2.5	2.0	2.0	1.0	4.0	0
Jordan Cr.-4	BLM boundary near Buck Cr. to BLM boundary	1.5	2.0	1.0	2.0	2.5	2.0	2.5	2.0	2.0	1.0	4.0	0
Jordan Cr.-5	BLM boundary section line to BLM boundary upstream of Louse Cr.	2.0	2.0	2.0	3.0	3.0	2.0	2.0	2.0	2.0	1.0	4.0	0
Jordan Cr.-6	BLM boundary upstream of Louse Cr. To BLM boudary section	3.0	3.0	2.5	3.0	2.5	2.0	2.5	2.0	2.0	1.0	4.0	0
Jordan Cr.-7	BLM Boundary to state land section boundary	2.0	2.0	2.0	3.0	3.0	3.0	2.5	2.0	2.0	1.0	4.0	0

4th Field HUC/ Reach Name	Description	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	1
Jordan Cr.-8	State linelands boundary to headwaters of Jordan Cr.	2.5	2.5	2.5	2.0	3.0	2.5	2.5	2.5	2.5	1.0	4.0	0
Williams Cr.	BLM segments	2.5	2.0	2.0	2.5	2.5	2.0	2.5	2.0	2.0	2.5	4.0	1
Williams Cr.	Including Pole Bridge Cr. And West Cr.	2.5	2.5	2.0	3.0	4.0	3.0	2.5	2.0	2.0	2.5	4.0	0
Duck Cr.	All	1.5	1.5	2.0	1.5	2.5	2.0	2.0	2.0	2.0	2.0	4.0	1
Old Man Cr.	All	1.0	2.0	1.0	2.0	3.0	0.0	2.0	2.0	2.0	2.0	1.0	0
South Mountain Creek	Lower BLM upper put state includes Howl Cr. Cyote Cr.	1.5	1.5	1.0	1.5	2.5	2.0	2.0	2.0	2.5	2.0	4.0	0
Rail Cr.	All	2.0	2.0	2.0	2.0	2.5	2.5	2.5	2.5	2.0	2.0	4.0	1
Washington Gulch	All	2.0	2.0	2.0	2.5	2.5	2.5	2.5	2.5	2.0	2.5	4.0	1
Flint Cr.1	Lower	2.8	2.5	3.0	1.5	2.5	2.5	3.0	3.0	2.0	1.5	4.0	0
Flint Cr.2	Upper Includes East Cr.	2.8	2.5	3.0	1.5	2.5	2.5	3.0	3.0	2.0	1.5	4.0	2
South Boulder Cr.	From confluence with North Boulder Cr. To confluence with Mill Cr.	2.5	3.0	2.5	2.3	3.0	2.8	2.5	2.5	1.5	2.0	4.0	1
Upper South Boulder Creek	Mill Creek confluence to headwaters	2.0	2.0	2.0	2.0	2.0	2.5	2.5	2.5	1.5	2.0	3.5	0
Indian Cr.	Bogus Cr. (Lower) - confluence with South Fork Boulder to Section 10	1.0	2.0	1.0	2.0	3.0	0.0	2.0	2.0	2.0	2.0	4.0	0
Bogus Cr.	Upper above section 10 and above	2.5	2.5	2.5	2.5	3.0	3.0	3.0	3.0	2.5	3.0	4.0	1

4th Field HUC/ Reach Name	Description	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	1
Combination Cr.	Lower reach of stream	1.5	2.0	2.0	2.5	3.0	2.5	1.5	2.5	2.5	2.5	4.0	1
Rose Cr.	Up to state section.	2.8	3.0	2.5	3.0	3.0	2.5	2.0	3.0	2.5	3.0	4.0	1
Josephine	includes Wickiup and Long Valley and Headwater Josephine	2.8	3.0	2.5	3.0	1.5	2.0	3.0	3.0	2.0	2.5	4.0	1
Louisa Cr.	From confluence with Rock Cr.	1.5	1.5	2.0	1.5	1.0	1.0	2.5	1.5	1.5	1.5	0.0	1
Lower Rock Cr.-1	From confluence of North Boulder to Meadow Creek.	3.0	3.0	3.0	2.5	1.5	1.5	2.5	3.0	2.0	3.0	4.0	1
Rock Cr.-2	From Meadow Creek to BLM	1.0	1.0	1.0	2.0	3.0	1.0	1.0	1.0	1.0	2.0	4.0	0
Rock Cr.-3	BLM portion in Section 26	3.0	3.0	2.5	2.5	1.5	1.5	2.0	3.0	2.0	2.0	4.0	0
Rock Cr.-4	From BLM/PVT boundary in Sec. 26 to above Triangle Reservoir.	1.0	1.0	1.0	2.0	3.0	1.0	1.0	1.0	1.0	2.0	4.0	0
Rock Cr. 5	BLM reach above Triangle Reservoir to Sheep Creek/private boundary	3.0	3.0	2.5	2.5	3.0	2.0	2.5	3.0	2.0	2.0	4.0	1
Rock Cr. 6	From Sheep Creek/private boundary to headwaters	2.0	2.0	2.0	3.0	4.0	3.0	3.0	3.0	2.0	2.0	4.0	0
Meadow Cr.	Headwaters to confluence with Rock Cr.	1.5	1.5	1.0	2.0	3.0	1.5	2.5	3.0	1.5	3.0	4.0	0
Deer Cr.	Confluence with Big Boulder to state section	2.8	2.8	2.5	2.0	2.5	2.5	2.5	3.0	2.5	3.0	2.0	1

4th Field HUC/ Reach Name	Description	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	1
	36												
Owl Cr.	Includes Minear Cr. (Confluence of Lone Tree to headwaters)	2.5	2.5	2.0	2.0	3.0	3.0	3.0	3.0	3.0	3.0	4.0	1
North Boulder-1	From confluence with Big Boulder; BLM reach to Private	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	2.0	3.0	4.0	1
North Boulder-2	From confluence with Mamouth Cr. To headwaters	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	2.0	3.0	4.0	1
Louse Cr.	Includes Cottonwood Cr. From confluence of Jordan Cr. To headwaters	1.5	2.0	1.0	2.0	3.0	1.0	2.0	2.0	2.5	2.0	4.0	1
Upper Trout Cr.	From Split Rock Canyon to headwaters, including Nichols, Wood Canyon creeks	2.0	2.0	1.8	2.0	3.0	1.5	2.0	2.5	2.5	2.0	3.0	1
Split Rock Canyon	Confluence with Trout Creek to headwaters.	2.5	2.0	2.0	2.0	3.0	2.5	2.5	2.5	3.0	2.5	4.0	1
Cow Cr.-2	From confluence with Wildcat Canyon Cr. To headwaters	2.0	2.0	2.0	2.0	3.0	2.5	3.0	3.0	2.0	2.0	4.0	1
Soda Cr.	From confluence of Cow Cr. To headwaters	2.5	2.5	2.0	2.0	3.0	3.0	2.0	3.0	2.0	2.0	4.0	1
HUC 17050107													

4th Field HUC/ Reach Name	Description	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	1
NF Owyhee 1	Lower; From the Oregon State line to the confluence of Juniper Cr.	3.0	3.0	3.0	2.5	3.5	2.0	3.0	3.0	2.0	3.0	4.0	1
NF Owyhee 2	Upper; Headwaters of North Fork , Lower Noon Cr. And Lower Pleasant Valley Cr.	3.0	3.0	3.0	3.0	3.5	2.5	3.0	3.0	2.5	3.0	4.0	1
Upper Pleasant Valley Cr.	From the top of Sec. 7 to headwaters	2.0	1.0	1.5	1.5	3.5	1.5	3.0	3.0	2.0	2.0	3.0	1
Cabin Cr.	From the confluence with Juniper Cr. To the headwaters	2.0	2.0	2.5	2.0	3.0	2.5	3.0	3.0	2.0	2.0	4.0	1
Juniper Cr. 1	From the confluence with the North Fork Owyhee to lower private boundary	2.8	3.0	3.0	2.5	3.0	2.5	3.0	3.0	2.0	2.0	4.0	1
Juniper Cr. 2	From the start of the private up to the headwaters	2.0	3.0	2.0	2.0	3.0	1.0	3.0	3.0	2.0	2.0	4.0	0
Lone Tree Cr.	From Oregon State line to headwaters	2.0	2.0	1.5	2.0	3.0	2.5	3.0	3.0	2.0	2.0	4.0	0
Cottonwood Cr.	From the upper private boundary (section 18) to headwaters	2.0	2.0	2.0	2.0	3.0	1.5	3.0	3.0	2.0	3.0	3.0	1
Squaw Cr. 1	From Oregon State line to lower private boundary (section 13)	3.0	3.0	3.0	2.5	3.5	2.5	3.0	3.0	2.0	3.0	3.0	1
Squaw Cr. 2	From the start of	3.0	4.0	3.0	3.0	4.0	2.0	3.0	3.0	2.0	3.0	4.0	0

4th Field HUC/ Reach Name	Description	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	1
	private in section 14 to the BLM in the northwest corner of section 31												
Squaw Cr. 3	From private to headwaters	2.0	2.0	2.0	2.0	3.5	2.0	3.0	3.0	2.0	2.5	4.0	0
Pole Cr.	Oregon State line to headwaters	3.0	3.0	3.0	2.5	3.5	3.0	3.0	3.0	3.0	3.0	4.0	2
Middle Fork Owyhee	Oregon State line to headwaters	0.5	1.5	1.5	2.0	3.5	1.5	2.0	1.5	1.0	2.0	4.0	2
HUC 17050106													
Little Owyhee	From the Nevada State line to the confluence with South Fork Owyhee	2.0	2.3	1.0	2.0	3.0	1.5	1.0	1.0	1.0	1.0	4.0	1
HUC 17050105													
South Fork Owyhee	From Nevada State line to the confluence with Owyhee River	2.8	3.0	2.5	2.0	2.5	1.5	2.5	3.0	1.5	3.0	3.0	1
HUC 17050104													
Blue Cr.-3	Blue Cr. Reservoir to headwaters	1.5	2.0	3.0	3.0	2.0	1.0	3.0	2.0	2.0	3.0	2.0	1
Shoofly Cr.-1	Confluence to BLM boundary	1.0	2.0	1.0	2.0	2.0	1.0	3.0	2.0	2.0	3.0	4.0	1
Shoofly Cr.-2	Private/BLM boundary to Bybee reservoir	2.0	3.0	2.0	3.0	1.0	1.0	3.0	3.0	2.0	3.0	1.0	1
Shoofly Cr.-3	Bybee reservoir to headwaters	2.0	3.0	2.0	3.0	3.5	2.5	3.0	3.0	2.0	3.0	3.0	0

4th Field HUC/ Reach Name	Description	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	1
Owyhee River	DV reservoir border to confluence	3.0	3.0	3.0	3.0	3.0	3.5	3.0	3.5	2.0	4.0	4.0	1
Owyhee River DVIR portion	Mouth of canyon to NV state line	1.0	1.0	1.0	2.0	3.0	1.0	2.0	2.0	1.0	3.0	4.0	1
Battle Cr.-1	Confluence to private in sec. 10 (cottonwood draw)	3.0	3.0	2.0	3.0	3.0	3.0	2.5	3.0	1.0	3.0	4.0	2
Battle Cr.-2	Section 10 to above state section 36	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	1.0	2.0	2.0	0
Battle Cr.-3	State section 36 to headwaters	1.5	2.0	1.0	2.0	3.5	1.0	3.0	2.0	2.0	2.0	3.0	1
Dry Cr.-1	confluence to reservoir	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	0
Dry Cr.-2	Reservoir to headwaters	1.0	1.0	1.0	2.0	4.0	1.0	3.0	2.0	1.0	3.0	1.0	1
Big Springs Cr.-1	confluence to reservoir	1.5	2.0	2.0	2.0	4.0	2.0	3.0	2.0	1.0	3.0	3.0	1
Big Springs Cr.-3	BLM boundary to private	1.0	2.0	2.0	2.0	4.0	2.0	3.0	2.0	1.0	2.0	4.0	1
Deep Cr.-1	Confluence to private	3.0	2.5	2.5	1.0	3.5	2.0	1.0	3.0	1.0	4.0	4.0	2
Deep Cr.-2	Private to mid section 10	2.0	1.5	1.5	1.0	3.5	2.0	1.0	3.0	1.0	4.0	4.0	2
Deep Cr.-3	section 10 to Stoneman Cr. Confluence	3.0	1.5	1.5	1.0	3.5	2.0	2.0	3.0	2.0	4.0	4.0	2
Deep Cr.-4	headwaters including:	1.0	1.0	1.5	1.0	3.5	2.0	2.0	3.0	2.0	3.0	4.0	2
Stoneman Cr.	Confluence to headwaters	2.0	1.0	2.0	2.0	3.0	1.0	3.0	3.0	2.0	3.0	3.0	2
Current Cr.	Confluence to headwaters	2.0	1.0	2.0	2.0	3.0	1.0	3.0	2.0	2.0	3.0	3.0	2
Nickel Cr.	Confluence to headwaters including:	2.0	3.0	3.0	1.0	3.5	2.0	3.0	3.0	2.5	3.0	4.0	2

4th Field HUC/ Reach Name	Description	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	1
Smith Cr.	Confluence to headwaters including:	2.0	2.0	2.0	1.0	3.5	2.0	3.0	3.0	2.0	3.0	4.0	2
Castle Cr.	Confluence to headwaters including:	1.0	2.0	2.0	1.0	1.0	1.0	2.0	2.0	1.0	3.0	1.0	2
Beaver Cr.	Confluence to headwaters including:	2.0	3.0	3.0	2.0	3.0	2.0	3.0	3.0	3.0	3.0	4.0	2
Red Canyon Cr.	Confluence to headwaters including:	1.5	2.0	2.0	2.0	3.5	2.0	3.0	3.0	1.0	3.0	4.0	2
Petes Cr.	Confluence to headwaters including:	1.5	1.5	1.5	1.5	3.5	2.0	3.0	3.0	1.0	2.0	4.0	2
Dickshooter Cr.	Confluence to headwaters	3.0	3.0	3.0	2.0	3.0	3.0	3.0	3.5	3.0	3.0	4.0	1
Pole Cr.-1	Confluence to Camas Cr. Confluence including Camel Cr.	2.5	3.0	3.0	2.0	3.0	2.0	3.0	3.0	1.0	3.0	4.0	1
Pole Cr.-2	Camas confluence to headwaters	2.0	2.5	2.5	2.0	3.5	1.0	3.0	3.0	1.0	3.0	3.0	1
Camas Cr.	Confluence to headwaters	3.0	3.0	2.5	2.0	3.5	2.0	3.0	3.0	2.0	3.0	4.0	1

Appendix Table 2.2.2 QHA scores for the Nevada portion of the Owyhee.

4th Field HUC/ Reach Name	Description	1.	2.	3.	4.	5.	6.	7.	8.	9.	10	11.	12.
HUC 17050104													
E.F. Owyhee ID-NV state line to Paradise Point Diversion	Irrigated hay fields, No RBT habitat	2.5	1.0	2.0	1.5	1.5	1.0	2.0	2.5	2.5	1.0	1.0	1
Boyle Cr	Starts in NV and enters Owyhee in ID	1.5	2.0	2.0	2.0	3.5	3.5	3.0	2.5	2.5	3.0	3.5	0.5
S.F of Boyle Cr		1.5	2.0	2.0	2.0	3.5	3.5	3.0	2.5	2.5	3.0	3.5	0.5
E.F. Owyhee Paradise Point to Duck Valley Indian Res border	DVIR	2.0	0.5	0.5	1.5	3.0	2.5	2.0	2.5	2.5	1.0	4.0	1
Skull Cr		1.5	2.0	2.0	2.0	3.5	3.5	3.0	3.0	2.5	3.0	3.5	0.5
N.F. of Skull Cr		1.5	2.0	2.0	2.0	3.5	3.5	4.0	3.0	2.5	3.0	3.5	0.5
E.F. of Skull Cr		1.5	2.0	2.0	2.0	3.5	3.5	4.0	3.0	2.5	3.0	3.5	0.5
Reed Cr		1.5	2.0	2.0	2.0	3.5	3.5	3.0	2.5	2.5	3.0	3.5	0.5
Summit Cr		1.5	2.0	2.0	2.0	3.5	3.5	3.0	2.5	2.5	3.0	3.5	0.5
Fawn Cr	USFS RBT occupied for sure 4.8miles	2.5	3.0	3.0	3.0	4.0	4.0	4.0	3.0	2.5	3.0	4.0	1.5
Jones Cr		1.5	2.0	2.0	2.0	3.5	3.5	3.0	2.5	2.5	3.0	3.5	0.5
Granite	probably fishless	1.5	2.0	2.0	2.0	3.5	3.5	3.0	2.5	2.5	3.0	3.5	0.5
E.F. Owyhee Duck Valley Indian Res border to Patsville (Mill Cr)	U.S.F.S.	2.0	2.0	1.0	2.0	3.0	2.5	2.5	2.5	2.5	0.5	4.0	1.5
Slaughter House Cr	Occupied RBT 2 miles	3.5	3.0	3.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	2
Brown's Gulch (Slaughter house Trib	2.4 miles RBT occupied	3.5	3.0	3.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	2
Miller Cr.	3 mile occupied RBT	2.0	3.0	3.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	2
West Fr. (of Slaughterhouse Cr)	1.5 miles occupied RBT	3.5	3.0	3.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	2
California Cr	Min. occupied RBT by headwater of Cr.	2.0	2.0	2.0	2.0	3.0	1.0	3.5	3.0	1.5	4.0	3.0	2
North Fr (trib of	No RBT, lack of	2.0	2.0	2.0	2.0	3.0	3.0	3.5	3.0	1.5	4.0	3.0	2

4th Field HUC/ Reach Name	Description	1.	2.	3.	4.	5.	6.	7.	8.	9.	10	11.	12.
California Cr)	flow(Drought yr)												
Dip Cr	1 mile RBT occupied	3.5	3.0	3.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	2
Big Springs Cr	Unoccupied (insufficient flow)	3.5	3.0	3.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	2
South Fr.	2 mile RBT occupied	2.5	3.0	3.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	2
Pixley	1 mile RBT occupied	3.5	3.0	3.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	1.0	2
E.F. Owyhee Mill Cr.to Badger Cr	U.S.F.S.	2.5	1.5	1.0	2.0	3.0	2.5	3.0	2.5	3.0	3.0	2.5	1.5
Lower Mill Cr to S.F Owyhee River	Unoccupied, pollution, mine tailings	0.5	2.0	0.5	2.0	3.0	3.0	2.0	2.0	2.0	0.5	4.0	2
Upper Mill Cr to Rio tinto Mine	occupied RBT whole distance in none drought years	3.0	3.0	3.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	2
McCall Cr.	5.5 miles occupied RBT	3.0	3.0	3.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	2
Allegheny	Native Dace only	2.0	2.0	2.0	2.0	3.0	1.0	3.5	3.0	1.5	4.0	3.0	2
Cold Spring (trib to Allegheny)	Native Dace only	2.0	2.0	2.0	2.0	3.0	1.0	3.5	3.0	1.5	4.0	3.0	2
Trail Cr	8.2 occupied RBT, Brook Trout(MGT concern)	3.0	3.0	3.0	3.0	4.0	2.0	4.0	4.0	3.0	3.0	2.0	2
Van Duzer Cr. (Trib to Trail Cr)	5 mile occupied, Brook Trout (MGR concen)	3.0	2.5	3.0	3.0	4.0	2.0	4.0	4.0	3.0	3.0	2.0	2
Lime Cr (trib to Van Duzer)	.3 occupied by RBT, Brook Trout prsnt	3.0	2.5	3.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	2
Cobb Cr (trib to Van Duzer)	4.5 RBT occupied	3.0	3.0	3.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	2
Deer Cr (trib to Trail Cr.)	min. occupied RBT in a single pool	2.5	3.0	3.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	1.0	2
Springs Cr.	0.1 mile RBT occupied, Brook trout	2.5	3.0	3.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	1.0	2
Wood Gulch	Mine prsnt, 2 mile RBT occupied	3.0	3.0	3.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	2
Hutch Cr	1mile RBT occupied, Brook Trout	2.5	2.0	3.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	1.0	2

4th Field HUC/ Reach Name	Description	1.	2.	3.	4.	5.	6.	7.	8.	9.	10	11.	12.
Timber Gulch	0.35 RBT occupied, Brook Trouth	2.5	2.0	3.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	1.0	2
Sheep cr	2 mile RBT occupied, Brook Trout	3.0	3.0	3.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	2
Road Canyon	1.2 RBT occupied	3.0	3.0	3.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	2
Gravel Cr	Lower 0.1 RBT occupied (spawning ground)	2.5	3.0	3.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	2
E.F. Owyhee Badger Cr. To Wildhorse Res.	U.S.F.S.	3.5	3.0	3.0	3.0	2.5	2.0	2.5	2.0	3.0	3.0	1.0	2
Badger Cr.	7 miles RBT occupied, some livestock concerns, fair condition, 1600 fish	2.5	2.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	2
Beaver Cr.	All occupied by RBT	2.5	2.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	2
Wildhorse Res		3.0	3.0	3.0	3.0	3.0	1.0	2.0	3.0	2.0	2.0	1.0	2
Hendricks Cr	RBT appearing (questionalble genetics,rainbow?)	2.5	2.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	2
Warm Cr (Trib of Hendricks)	not RBT occupied, warm water temp, soil type/erosion, agriculture	2.5	2.5	4.0	4.0	4.0	2.5	3.0	3.0	3.0	4.0	3.5	2
Penrod	RBT occupied entire way	2.5	2.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	2
Hay meadow Cr	only native dace present	2.0	2.0	2.0	2.0	3.0	1.0	3.5	3.0	1.5	4.0	3.0	2
Thompson Cr (hay meadow trib)	no fish present in drough yrs	2.0	2.0	2.0	2.0	3.0	1.0	3.5	3.0	1.5	4.0	3.0	2
Martin Cr. (trib to Penrod)	4.5 RBT occupied, Brook Trout	3.0	2.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.5	2
Gold Cr. (trib to Martin Cr)	1.8 RBT occupied	2.5	2.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	2
Sweet Cr	0.5 RBT occupied	2.0	2.0	2.0	2.0	3.0	1.0	3.5	3.0	1.5	4.0	3.0	2
Rosebud Cr	Native Dace only	2.0	2.0	2.0	2.0	3.0	1.0	3.5	3.0	1.5	4.0	3.0	2
Deep Cr trib to Wildhorse (E.F. Owyhee)	1.5 miles occupied RBT, some on prvt land?	3.0	3.0	3.0	3.0	4.0	2.0	4.0	4.0	3.0	3.0	3.0	2
Clear Cr trib to (Deep Cr)	no fish present in drough yrs	3.0	3.0	3.0	3.0	4.0	2.0	4.0	4.0	3.0	3.0	4.0	2

4th Field HUC/ Reach Name	Description	1.	2.	3.	4.	5.	6.	7.	8.	9.	10	11.	12.
Riffe Cr (Deep Cr)	3 mile occupied RBT, beaver ponds	3.0	3.0	3.0	3.0	4.0	2.0	4.0	4.0	3.0	3.0	4.0	2
N.F. of Deep Cr	No RBT, lack of flow(Drought yr)	3.0	3.0	3.0	3.0	4.0	2.0	4.0	4.0	3.0	3.0	4.0	2
Middle Fork of Deep Cr	2 mile occupied RBT	3.0	3.0	3.0	3.0	4.0	2.0	4.0	4.0	3.0	3.0	4.0	2
S.F of Deep Cr	3 miles RBT occupied	3.0	3.0	3.0	3.0	4.0	2.0	4.0	4.0	3.0	3.0	4.0	2
E. F. Owyhee Above Wildhorse Res to head waters	Spotted Frog habitat	2.5	2.5	3.0	1.0	3.0	1.5	2.0	3.0	2.0	3.0	3.0	2
Clear Cr trib to Upper E.F Owyhee	Historic potential habitat, poisioning in 1988 to remove chub, killed Trout	3.0	3.0	3.0	3.0	4.0	3.0	4.0	4.0	3.0	3.0	3.0	2
Hanks Cr trib to Upper E.F Owyhee	Dace prsnt, habitat concerns (livestocke) no RBT	1.5	2.0	2.0	2.0	3.0	3.0	4.0	3.0	2.0	2.0	4.0	2
HUC 17050105													
State line to Petan ranch	Red Band prsnt seasonally(Spring) during good water yrs when sutiable water temps	2.5	4.0	2.5	3.0	2.0	4.0	4.0	2.5	3.0	3.5	2	2.5
Lower boundry of Petan Ranch to Red Cow Cr.	Red Band prsnt seasonally(Spring) during good water yrs when sutiable water temps	2.0	2.0	2.5	3.0	2.0	4.0	4.0	2.5	3.0	3.5	2	2.5
From Red Cow to Hot cr.	RBT Occupied yr round, low density	2.5	3.0	2.5	3.0	2.0	4.0	4.0	2.5	3.0	4.0	2	2.5
hot creek to McCann	Prvt Land, Brook Trout prsnt in Spring Heads, RBT are seasonal, White Fish yr round	2.5	2.0	2.5	3.0	2.0	4.0	4.0	3.0	3.0	3.0	1	2.5
Four mile cr from S.F. to Chimney Res.	RBT Down migration during good water yrs, dry 10months of yr, flow controlled by Chimney	2.0	1.5	3.0	2.0	1.0	3.0	3.0	2.0	4.0	2.0	1	2.0
Chimney Cr. Res to T41N	RBT Down migration during	1.5	1.5	2.0	4.0	4.0	4.0	4.0	2.0	4.0	4.0	2	1.0

4th Field HUC/ Reach Name	Description	1.	2.	3.	4.	5.	6.	7.	8.	9.	10	11.	12.
R49E sec4	good water yrs, dry 10months of yr, flow controlled by Chimney												
T41N R49E sec4 to Head Waters	Occupied by RBT year round, 3miles of reach occupied	2.5	2.0	2.5	4.0	4.0	4.0	4.0	2.0	4.0	4.0	2	2.0
Chimney Cr Res. To Winters Cr.	Int/Dry 10mnths/yr, no RBT	1.5	1.5	2.0	4.0	4.0	4.0	4.0	2.0	4.0	4.0	1	1.0
Winters Cr.	Recently occupied, but not currently, historic habitat (no record), stocked in 1972 with RBT, ceased in 2000due to fire/livestock grazing	2.5	2.0	2.5	4.0	4.0	4.0	4.0	2.0	4.0	2.5	2	2.0
Sheep Creek-S.F. Owyhee to Sheep Cr. Res		1.5	1.5	2.0	4.0	4.0	4.0	4.0	2.0	4.0	1.0	0.5	1.0
Sheep Cr. Res to T46n R51E sec 11	Int/Dry, no RBT, spring down migration	1.5	1.5	2.0	4.0	4.0	4.0	4.0	2.0	4.0	4.0	0.5	1.0
T46n R51e sec 11 to head waters		1.5	1.5	2.0	4.0	4.0	4.0	4.0	2.0	4.0	4.0	0.5	1.5
Indian Cr. (Trib to S.F. Owyhee)	Occupied RBT through National Forest	3.0	3.0	3.0	3.0	3.0	4.0	4.0	3.0	4.0	1.0	1.5	3.0
Winters Cr. Trib to Indian Cr	2 miles occupied RBT through National Forest	3.0	3.0	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0	1.5	3.0
Mitchell Cr. Trib to Indian Cr	2 miles occupied RBT through National Forest	3.0	3.0	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0	1.5	3.0
Wall Cr. Trib to Indian Cr	1 Mile occupied RBT through National Forest	3.0	3.0	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0	1.5	3.0
Silver Cr. (Trib to S.F. Owyhee)	2 miles occupied RBT through National Forest	2.0	3.0	2.5	3.0	2.5	4.0	4.0	3.0	4.0	3.0	1.5	3.0
White Rock Cr.	Unoccupied, probably historic, mining influence	3.0	3.0	3.0	3.0	2.5	4.0	4.0	3.0	4.0	3.0	1.5	3.0

4th Field HUC/ Reach Name	Description	1.	2.	3.	4.	5.	6.	7.	8.	9.	10	11.	12.
Cottonwood Canyon Cr.	Unoccupied, probably historic, mining influence	3.0	3.0	3.0	3.0	2.5	4.0	4.0	3.0	4.0	3.0	1.5	3.0
Breakneck Cr	2 miles occupied RBT	3.0	3.0	3.0	4.0	4.0	4.0	4.0	3.0	4.0	3.0	1.5	3.0
Bull Run Cr.- S.F. Owyhee to Bull Run Canyon	Diverted for Agriculture use	2.0	3.0	2.5	3.0	2.5	4.0	4.0	3.0	4.0	3.0	0.5	3.0
Mouth of Bull Run Canyon to Cap Winn Cr.	probably recruitment from upstream tribs	3.0	3.0	3.0	3.0	3.0	4.0	4.0	3.0	4.0	2.0	1.5	3.0
Frost Cr.	Low number of RBT	2.5	2.0	2.0	4.0	4.0	4.0	3.0	3.0	4.0	4.0	2	1.0
Cap Winn Cr	Occupied RBT,	3.0	2.0	2.0	4.0	4.0	4.0	3.0	3.0	4.0	4.0	2	1.5
Doby George	Occupied RBT,	3.0	2.0	2.0	4.0	4.0	4.0	3.0	3.0	4.0	4.0	2	2.0
Columbia Cr	Occupied RBT, Low number (200's), Brook Trout abundant	3.0	3.0	3.0	4.0	4.0	4.0	4.0	4.0	3.0	3.5	2	3.0
Blue Jacket Cr	Occupied RBT (700), Brook Trout	3.0	3.0	3.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	2	3.0
Deep Cr. Trib to S.F. Owyhee		2.0	2.0	1.5	2.5	2.0	4.0	3.0	3.0	4.0	2.0	2	1.5
S.F Owyhee to Head Waters	Unoccupied, RBT probably present historically												
Red Cow Cr.	Occupied 1mile by RBT	2.0	1.0	3.0	3.0	2.0	4.0	3.0	3.0	4.0	4.0	2	1.5
Amazon	Ephemerial, no record of RBT, probably historic	2.0	1.0	3.0	3.0	2.0	4.0	3.0	3.0	4.0	4.0	1	1.5
Big Cottonwood Trib	1mile occupied by RBT	2.0	1.0	3.0	3.0	2.0	4.0	3.0	3.0	4.0	4.0	2	1.5
Harrington Cr	Unsurveyed, Prvt Land, Probable RBT	3.0	3.0	3.0	4.0	4.0	4.0	4.0	4.0	3.0	3.5	1	3.0
Marsh Cr.	Occupied RBT	3.0	3.0	3.0	4.0	4.0	4.0	4.0	4.0	3.0	3.5	2	3.0
Boyd Cr	Occupied RBT	3.0	3.0	3.0	4.0	4.0	4.0	4.0	4.0	3.0	3.5	2	3.0
Scoonover Cr.	Occupied RBT	3.0	3.0	3.0	4.0	4.0	4.0	4.0	4.0	3.0	3.5	2	3.0
Dorsey	Occupied RBT	3.0	3.0	3.0	4.0	4.0	4.0	4.0	4.0	3.0	3.5	2	3.0
Coffin Cr.	Occupied RBT	3.0	3.0	3.0	4.0	4.0	4.0	4.0	4.0	3.0	3.5	2	3.0
Jack Cr	Occupied RBT, no brook trout surveyed in last	3.0	3.0	3.0	4.0	4.0	4.0	4.0	4.0	3.0	3.5	2	3.0

4th Field HUC/ Reach Name	Description	1.	2.	3.	4.	5.	6.	7.	8.	9.	10	11.	12.
	2yrs(used to be abundant)												
Chicken Cr	Occupied RBT,	3.0	3.0	3.0	4.0	4.0	4.0	4.0	4.0	3.0	3.5	2	3.0
Mill Cr	Occupied RBT, Brook trout, included 3 forks	3.0	3.0	3.0	4.0	4.0	4.0	4.0	4.0	3.0	3.5	2	3.0
Niagra Cr	No Surveyed Data	3.0	3.0	3.0	4.0	4.0	4.0	4.0	4.0	3.0	3.5	0.5	3.0
Snow Canyon Cr	Occupied RBT, 5 mi occupied	3.0	3.0	3.0	4.0	4.0	4.0	4.0	4.0	3.0	3.5	2	3.0
Jarritt Canyon	Int/Dry, Unoccupied, Histeric Salmon	2.5	2.0	3.0	4.0	4.0	4.0	4.0	4.0	3.0	3.5	1.5	2.5
Burns Cr.(Trib to Jarritt Canyon0	1.5 mile occupied on National Forest, Trout Prsnt	3.0	3.0	3.0	4.0	4.0	4.0	4.0	4.0	3.0	3.5	2	3.0
Schmidtt Cr.	4 miles occupied	3.0	3.0	3.0	4.0	4.0	4.0	4.0	4.0	3.0	3.5	2	3.0
McCann Cr	5 mile occupied RBT, low desnity RBT	2.5	2.0	2.5	3.0	2.0	4.0	3.0	3.0	4.0	3.0	2	2.0
Taylor Canyon Cr (trib to S.F. Owyhee)	2 miles occupied RBT, BT common	3.0	4.0	3.5	4.0	4.0	4.0	4.0	4.0	4.0	3.0	2	4.0
Water Pipe Canyon (trib to Taylor Canyon)	2.5 mile occupied RBT	2.5	3.0	3.0	4.0	4.0	4.0	4.0	3.0	4.0	3.0	2	2.0

Appendix Table 2.2.3 QHA scores for the Oregon portion of the Owyhee.

4th Field HUC/ Reach Name	Description	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
Owyhee R-1	Mouth to Owyhee Ditch Co Dam (RM14)	3.5	2.5	2.5	1.0	1.0	1.0	0.5	2.0	1.5	3.0	3.0	1
Owyhee R-2	DC Dam to RM28	3.0	3.0	3.5	3.5	2.0	2.0	3.5	2.5	1.0	3.5	4.0	2
Owyhee R-3	Dam to Upstream High Water (RM80)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NA
Dry Creek	Dry Creek upstream to Crowley Road	2.5	3.0	3.0	3.0	2.5	2.5	3.0	3.5	2.0	4.0	3.5	2
Owyhee R-4	High Water upstream to Jordan Cr	3.5	3.5	3.5	3.0	3.5	3.5	3.5	4.0	3.0	3.0	4.0	2
Rinehart Creek	Mouth to falls	3.5	3.5	3.5	3.0	3.5	3.5	3.5	4.0	4.0	4.0	3.5	1
Jordan Creek	Mouth to State Line	2.0	2.5	2.0	2.0	2.5	1.0	1.5	3.0	1.0	3.0	2.5	1
Cow Creek	Mouth to State Line	1.0	2.5	2.0	2.0	3.5	1.0	1.5	3.0	1.0	4.0	2.5	0.5
Owyhee R-5	Confl. Jordan Creek upstream to Sline	3.5	3.5	3.5	3.5	3.5	3.5	3.5	4.0	3.0	4.0	4.0	2
NF Owyhee	Mouth to Sline	3.0	3.5	3.5	3.5	3.5	3.5	3.5	4.0	3.0	4.0	4.0	2
Middle Fork	Idaho Segment ()	1.5	3.5	3.5	2.0	3.0	3.5	3.0	4.0	3.0	4.0	4.0	0
Antelope Creek R-1	Mouth upstream to corrals (~8 mi)	4.0	4.0	4.0	3.0	3.5	3.5	3.5	4.0	3.5	4.0	4.0	2
Antelope Creek R-2	Corrals upstream to Star Valley Road (dry segment)	3.5	3.5	3.5	3.0	3.5	3.5	3.5	4.0	4.0	4.0	4.0	2
Antelope Creek R-3	SV Road upstream to Headwaters	2.5	3.0	2.5	3.0	3.5	3.5	2.5	3.5	2.5	4.0	4.0	2

4th Field HUC/ Reach Name	Description	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
WLO R-1	Mouth upstream to Anderson Crossing	3.5	3.5	3.5	3.0	3.5	3.5	3.5	4.0	3.0	4.0	4.0	2
WLO R-2	Anderson Crossing to headwaters	3.5	3.5	3.5	3.5	3.5	3.5	3.5	4.0	3.0	4.0	4.0	2

Appendix Table 2.2.4 Key and definitions for QHA habitat attributes for the appendix tables above. The number code in the first column of this table corresponds to the habitat attributes in the header of the QHA rating tables.

#	Attribute	Description
1.	Riparian Condition	Condition of the stream-side vegetation, land form and subsurface water flow.
2.	Channel stability	The condition of the channel in regard to bed scour and artificial confinement. Measures how the channel can move laterally and vertically and to form a "normal" sequence of stream unit types.
3.	Habitat Diversity	Diversity and complexity of the channel including amount of large woody debris (LWD) and multiple channels.
4.	Fine sediment load	Amount of fine sediment within the stream, especially in spawning riffles.
5.	High Flow	Frequency and amount of high flow events.
6.	Low Flow	Frequency and amount of low flow events.
7.	Oxygen	Dissolved oxygen in water column and stream substrate.
8.	Low Temperature	Duration and amount of low winter water temperatures that can be limiting to fish survival.
9.	High Temperature	Duration and amount of high summer water temperature that can be limiting to fish survival.
10.	Pollutants	Introduction of toxic (acute and chronic) substances into the stream.
11.	Obstructions	Dam, irrigation diversion, or natural geologic feature that blocks fish movement.
12.	Reach Confidence	Confidence Rating (0-1-2 scale), where: 0 = Speculative; 1 = Expert Opinion; and 2 = Well Documented.

Appendix Table 2.2.5 Key for scoring habitat attributes in "Current" QHA appendix tables above.

Score	Attribute Rating	Normative (definition)
0	0% of normative	Ideal conditions for similar stream in this ecological province. Note that this is more from a geomorphic perspective than a biological perspective.
1	25% of normative	
2	50% of normative	
3	75% of normative	
4	100% of normative	

2.3 Appendix 3. Description of the Qualitative Habitat Assessment (QHA) Model.

The following sections have excerpts from McConnaha et al. (2003) that explain the basic ecological processes incorporated into the Qualitative Habitat Assessment (QHA) Model.

Source:
Chip McConnaha, Drew Parkin and Jeff Fryer. 2003. QHA User's Guide for Subbasin Planning in Oregon. December 3, 2003. CRITFC, Portland, Oregon fryj@critfc.org and qha@subbasin.org.

2.3.1 Comparison of QHA with Ecosystem Diagnosis and Treatment (EDT) used for Anadromous Subbasins.

QHA relies on the same conceptual framework as the more technically sophisticated Ecosystem Diagnosis and Treatment (EDT) technique. There are, however, several significant differences. While each of the habitat characteristics used in QHA is also used in EDT, EDT considers many more habitat factors and seeks to link these directly to measurable data. QHA, by contrast, relies on the judgment of knowledgeable professionals to draw this link.

EDT relies on a set of biological rules derived from the technical literature to establish the link between a species and its habitat. Again, QHA relies on professional judgment to make this link. EDT uses a series of life history trajectories to model the movement of fish through its environment over several life stages. QHA collapse life history into fewer stages and treats each stream reach as a static unit. Again, QHA relies on the knowledge of experts to think through these life history dynamics.

EDT analysis can incorporate, or, more accurately, link to information on out-of-subbasin effects, i.e., survival outside of the natal subbasin. QHA relies on expert opinion to make this connection.

Lastly, EDT produces a series of numerical products that estimate productivity, abundance, and related factors that give an indication of how well habitat supports fish. As a qualitative technique QHA does not generate these outputs but rather produces a series of products that suggest directions for management but explicitly leaves the decision process up to experts.

Appendix 2.3.2 Description of QHA Excel Workbook Tabs/worksheets.

Setup Worksheet

This sheet provides a means for subbasin planners to input essential background information on the drainage being assessed, the focal species being considered, and the people contributing to the assessment. It also provides a brief summary of the method.

Current and Reference Worksheets

Summary. The "reference" and "current" tables are the heart of the assessment. Using these tables subbasin planners characterize the physical condition of the subbasin. This is accomplished by supplying information concerning a range of habitat characteristics, with information arrayed by reach.

Definition of Reference. In the "reference" conditions table we consider what this subbasin would be like if the system were restored to the fullest extent possible short of disrupting infrastructure that is vital to modern society and that is likely to remain in place for the foreseeable future. In a subbasin with little cultural modification this reference condition might equate to "historic" conditions, that is, the conditions that were in place prior to European settlement. By contrast, in a largely urbanized subbasin, say, the lower Willamette in Portland, this might mean accepting the urban fabric but taking aggressive action to restore habitat within the confines of this urban fabric.

Definition of Current. In the "current" conditions table we rate the condition of the aquatic environment as it is today. The one conceivable wrinkle is a situation where significant habitat enhancement is currently underway that would significantly change habitat quality. In these cases planners may decide to characterize current conditions as if these enhancements were complete.

Habitat Characteristics. In both the reference and current condition tables we look at 11 habitat characteristics, or attributes. These eleven are:

1. Riparian condition
2. Channel form
3. Habitat diversity

4. Fine sediment
5. High flow
6. Low flow
7. Oxygen
8. High temperature
9. Low temperature
10. Pollutants
11. Obstructions

Definitions of the above attributes are found in the QHA "definitions" worksheet.

These are the habitat characteristics that are generally thought to be the main "drivers" of fish production and sustainability. There may, of course, be unique situations where planners believe that other factors may be equally or more important. While, for purposes of consistency we encourage planners to retain the existing list of factors, it is possible to delete a factor and add another -- or to expand the definition of a factor to encompass a more expansive concept. If this is the case, planners should clearly identify the change and document why this change was made. Theoretically it would also be possible to add factors. We have elected to not offer this option as it would decrease consistency and have implications for the Excel algorithms.

To make it easier to interpret results, we have also included a provision for entering distance (river mileage) data for both the reference and current conditions. If stream lengths have changed due to channelization, diversions, filling, or other such activities, the stream mile values can be changed in the reference conditions. Note that this data does not affect results. It only appears in the output as a table giving the number of current miles of habitat and the relative change from the reference condition.

Defining Reaches or Small Watersheds. Here we define a series of "reaches" or "small watersheds" that collectively make up the subbasin. Subbasin planners make the decision regarding whether to use reaches or small watersheds and how these will be defined. A reach (or segment) is a linear stretch of stream that is defined by hydrological or ecological characteristics. A small watershed is a polygonal unit that includes several reaches that drain to the same point. The USGS/EPA hydrologic unit system available at http://NWPCC.bpa.gov provides the basis for developing both reach and watershed definitions.

Reaches may be hydrologically defined, as is the case in the USGS/EPA river reach system where a reach is defined as the area between confluences. The 1:100,000-scale river reach system is the best example. Using this scale a subbasin will typically have between 1,000 and 3,000 reaches depending on size. This is probably beyond the scope of this project and in many cases planners will seek to define larger reaches that would bring the total number down to, say, 60 for the smallest subbasin and 300 for the largest. (This is the number of reaches that the developers of this system consider to be most appropriate for this type of assessment. We base this on (1) the accuracy that is possible through a qualitative assessment, and (2) the amount of time that it will take to fill in the

table.) The alternative to a purely hydrological reach definition is a system based on ecological character, whereby subbasin planners manually review the streams in the subbasin and divide them into meaningful ecologically-consistent segments. The number of reaches will depend on the level of resolution. Planners could "lump" or "split" to arrive at a number of reaches that is scientifically defensible and realistic in terms of workload.

Filling in the Table. The reference and current condition tables consider the relative value of the physical environment to fish productivity and sustainability by viewing each of the 11 habitat factors through the eyes of the focal species that inhabit the area. The cell that forms the intersection between a reach and a habitat characteristic is rated according to the following rating scheme:

0 = 0% of normative (range 0%-12.5%)
1 = 25% of normative (range 12.5%-37.5%)
2 = 50% of normative (range 37.5%-62.5%)
3 = 75% of normative (range 62.5%-87.5%)
4 = 100% normative (range 87.5%-100%)

There is no magic in the above rating scheme. Our intent was to have enough categories that knowledgeable professionals could discriminate between values but not so many that it would exceed what is considered realistic in a qualitative assessment. Planners have the option of using whole numbers (0 through 4) or using decimal places if they wish to discriminate more finely. We encourage planners to use just whole numbers or, if they must differentiate further, go no further than the midpoints between these whole numbers (i.e. 0.5, 1.5, 2.5, 3.5).

For the algorithm to work each and every cell must be rated. If a cell is not rated, it will be treated as if a zero was entered. If you absolutely do not know give a rating based on what you would suspect it to be and give a low confidence. (One way to do this would be to extrapolate a rating using another similar area where you have a higher level of confidence.)

Confidence Levels. Below the list of habitat characteristics is a row entitled "attribute confidence." In this row subbasin planners have the option of rating the level of confidence that those filling in the table have in their knowledge of each habitat characteristic in this subbasin. The rating scale is as follows:

0 = speculative
1 = expert opinion
2 = well documented

Similarly, at the right side of the table is a column labeled "reach confidence." This provides planners with the option of identifying the confidence that the planners have in their knowledge of individual reaches. The same rating scale is used (as above).

By filling in the row and column confidence ratings it is possible to ascribe a confidence level for any given cell in the table. In fact, this is what the spreadsheet does (though you cannot see it yet.) Essentially, what happens is as follows:

(1) For each cell a rating is given that is the sum of the row and column confidence ratings, i.e., a number between 0 and 4.
(2) The ratings in each row are added up to give a number between 0 and 44.
(3) The ratings are averaged, giving a number between 0 and 4.
(4) The averaged ratings are divided by 4. This gives a final rating between 0 and 1.

In the tornado worksheet you will see a "restoration confidence" and a "protection confidence" rating for each reach. These numbers were derived using the above formula.

Documentation. The table offers the opportunity to identify source materials or make comments. Planners will have to decide the extent to which they wish to use this. At the least, planners should seek to create a list of bibliographic references that they consulted in completing the table. Whether they link these to individual reaches/watersheds or create one list for the subbasin is up to them.

Species Hypothesis Worksheet

The "species hypothesis" worksheet is a table that provides subbasin planners with the opportunity to apply their understanding of biological systems to make decisions regarding the relative importance of each life stage to fish productivity and sustainability. The first order of business is to rate the life stages according to overall importance in the subbasin (the LifeStageRank table). Note that while there are several ways to delineate life stages, we have opted for the most simple – spawning, summer rearing, winter rearing and migration. (Migration also includes adult.) Planners should rate life stages using a 4 to 1 scale, with 4 being most important. You may rate all life stages differently (1, 2, 3, 4) or give some or all life stages the same value. Giving three a weight of 1 and the fourth a weight of 4 would indicate that one is significantly more important than the others. The reason for doing this is to define the life stage that will be used to evaluate the importance of the various habitat factors.

The second task is to rate each habitat characteristic for each life stage (Habitat Attribute table). The scale is as follows:

0 = no effect
1 = does effect
2 = critical effect

By rating both life stages and habitat characteristics you are establishing a simple hypothesis concerning how a given species interacts with its environment in this subbasin. The QHA applies the hypothesis to the information you have developed in the reference and current condition tables to develop a series of products. (We will get to the

products later.) The sample QHA presents one typical hypothesis where spawning is weighted highest, then rearing and certain factors (e.g., sediment) is given a proportionally higher importance for the spawning life stage. The most simple hypothesis would be to rate all life stages equally (any number from 1 to 3 would work but for sake of this discussion use 1) and assume that all habitat characteristics made the same contribution to the species (i.e., give all habitat characteristics a 1 for all four life stages). In practice, it may be useful to consider more than one hypothesis, for example all 1s as described immediately above and one or more hypotheses where you use differential weightings. You could then generate a set of products using both hypotheses and compare findings.

Species Range Worksheet

This Table arrays focal species distribution by reach (Species Range table). You will note that two conditions are identified – reference and current. For each there are four categories – range, spawning/incubation, summer rearing, winter rearing, and migration. The idea is to tag those reaches/small watersheds where the fish are present during any life stage and to weight the importance of that reach to each life stage of the fish. Weightings can range from 0 to 2 where 0 is not present and 2 would be the highest possible weighting. For the current condition biologists will use their knowledge of the subbasin. In many cases there are GIS data layers available to help with this. See www.streamnet.org or contact the river information system people in your state's fish and wildlife agency. For the reference condition you will obviously need to extrapolate from your understanding of what conditions are required by fish at a given life stage and what conditions would be like if the subbasin were fully restored). In almost all cases the current distribution will be the same as – or a subset of – the reference conditions. In a subbasin with little disturbance the reference and current distribution may close to the same. In a disturbed subbasin there may be areas not currently inhabited by the focal species but where the focal species would return if habitat conditions were improved. This is, by the way, the case in the sample QHA where Whale Creek does not currently have fish but could if restored.

One should be aware that the distributionTable and the life stage/habitat characteristics Table interact. That is, in the computations the ratings given in the life stage/habitat characteristics Table are applied to reaches where a given life stage exists. For a hypothesis where all life stages and characteristics received the same weight (e.g., 1), this would have no effect. But if you had weighted one life stage higher than the others, and if a given reach had all four life stages present, the life stage with higher ratings will have greater impact than those with lower ratings.

The user should also rate the percentage of the stream miles utilized by the focal species both currently and in the reference condition. These data are used to compute the miles of a reach currently, and formerly, used by the focal species along with the percentage habitat loss for display on the tornado page. It is not used in the calculation of habitat protection or restoration ratings.

Habitat Ranking Worksheet

This Table identifies relative protection and restoration value by reach and habitat characteristic, based on an algorithm using information from the current, reference, species hypothesis, and species range tables. The highest value is given a 1 (and highlighted in red), followed by 2 and so on. The Table also identifies which reaches/small watersheds offer the most value (to the left of each row under the "reach score" heading) and which habitat characteristics (at the bottom of each column by the "attribute score" heading) are most important. These scores adhere to the same 1, 2, 3 hierarchy.

This Table gives planners a snapshot of what the protection and restoration opportunities may be given the information that was used in creating the table. Planners should not accept this as absolutely correct or as the total answer. Rather, they should use it as a tool to provoke thought. Does this Table.appear to reflect what experts believe to be the case with this system? If not, why is this? What does this suggest about limiting factors? Are there assemblages of habitat characteristics that are influenced by the same upland land uses? Are there opportunities for re-connections between reaches or small watersheds? Are there clusters of reaches/small watersheds in close proximity that exhibit similar characteristics and that should be considered as a group?
The Algorithm. The restoration rankings Table is generated from information in the reference and current conditions tables and the hypothesis tables. Rankings are generated initially by the following equation:

where "i" is the life stage (spawning, winter rearing, summer rearing, migration) and j is the reach.
A protection habitat score is computed for each habitat variable as:

A restoration habitat score is computed for each habitat variable as:

Tornado Worksheet

Click on the tornado worksheet and you will see a summary chart that shows, for each reach: (1) relative restoration ratings, (2) relative protection ratings, (3) confidence ratings for each of these, and (4) the miles of current habitat and percent habitat loss. We call the Figure giving relative restoration and protection ratings a tornado because it looks like one. Note that often a reach will have both restoration and protection value. The purpose of this graph is to allow planners to look at the system from a holistic perspective. It also gives an indication of the confidence that planners have in potential restoration and protection priorities and may suggest areas where future research is needed.

To the right of the tornado diagram is a column listing, by reach, the miles of current habitat and the percent habitat loss. This provides a measure of the magnitude of the

task of restoring or protecting a reach, and also provides an estimate of the historic habitat that has been lost.

Miles of current habitat is computed as the sum of the total miles of habitat from the Current sheet multiplied by the Current percent reach utilization from the Species range sheet. A similar computation is made to estimate the total miles of reference habitat. Percent habitat loss is calculated as:

Where C is the total miles of current habitat and H is total miles of historic habitat.

Definitions Worksheet

This worksheet presents definitions for each of the habitat characteristics used in the QHA. It also presents a Table that identifies the types of measurable data that could be useful in determining the condition of each habitat characteristic.

Reference Documents Worksheet

This serves as a repository for bibliographic references and comments. It serves a key documentation role and provides a means to generate a bibliography for the assessment portion of the plan document.

How do we deal with areas were we have no information?

Information gaps are an issue regardless of assessment technique. A technique based on expert opinion (as is the case with QHA) probably allows more flexibility for dealing with this issue than a purely quantitative approach that relies on measurable field sampling. One approach for dealing with this is to identify similar watersheds where there is a good base of information and assume that the target watershed has similar environmental characteristics and biological responses. If this is done it is important to make note of this in the comment fields. Planners will also want to give a confidence rating that reflects this. If there is no information and no similar watersheds (a highly unlikely scenario), planners may leave blank those rows in the “current” habitat rating Table where this is the case. If this is the case please leave the entire row blank or the program will attempt to compute a score with only partial information and errors will result.

The QHA responds to two of the major criticisms of qualitative assessment approaches in that: (1) it channels expert opinion into a logical and sequential thought process, and (2) it provides a means to track and document decisions. In addition, just because this is labeled a qualitative approach does not mean that it ignores quantitative information. Quite the contrary, planners who use QHA are urged to base their assessments on measurable data wherever and whenever these exist.

2.4 Appendix 4. Sensitive Plants.

Appendix Table 2.4.1 Listing of Sensitive Plants in the Owyhee Subbasin (ONHP 2001; ICDC 2001; NNHP 2001a; NNHP 2001b)

Scientific Name	Common Name	NVE[1]	NVH	OR	ID
Allenrolfea occidentalis	Iodine bush			x	
Allium bisceptrum	Two-stemmed onion			x	
Amsinckia carinata	Malheur Valley fiddleneck			x	
Angelica kingii	Nevada angelica				x
Antennaria arcuata	Meadow pussytoes	x			
Arabis falcatoria	Grouse Creek rockcress	x			
Arabis falcifructa	Elko rockcress	x			
Argemone munita	Prickly-poppy			x	
Artemisia packardiae	Packard's artemisia			x	
Artemisia papposa	Owyhee sagebrush			x	
Astragalus alvordensis	Alvord milkvetch			x	
Astragalus anserinus	Good Creek milkvetch	x			
Astragalus atratus var. owyheensis	Owyhee milkvetch			x	
Astragalus calycosus	King's rattleweed			x	
Astragalus calycosus var. monophyllidius	One-leaflet torrey milkvetch	x			
Astragalus jejunus var. jejunus	Starveling milkvetch	x			
Astragalus lentiginosus var. latus	Broad-pod freckled milkvetch	x			
Astragalus mulfordiae	Mulford's milkvetch			x	x
Astragalus newberryi var. castoreus	Newberry's milkvetch				x
Astragalus purshii var. ophiogenes	Snake River milkvetch			x	x
Astragalus robbinsii var. occidentalis	Lamoille Canyon milkvetch	x			
Astragalus solitarius	Lonesome milkvetch		x		
Astragalus sterilis	Barren milkvetch				x
Astragalus sterilis var. cusickii	Sterile milkvetch			x	
Astragalus tetrapterus	Four-wing milkvetch			x	x
Astragalus tiehmii	Tiehm milkvetch		x		
Astragalus yoder-williamsii	Osgood Mountains/Mud Flat milkvetch	x	x		x

Scientific Name	Common Name	NVE[1]	NVH	OR	ID
Atriplex powellii	Powell's saltbush			x	
Bergia texana	Texas bergia			x	
Blepharidachne kingii	King's desertgrass				x
Camissonia palmeri	Palmer's evening primrose			x	x
Camissonia pterosperma	Winged-seed evening primrose				x
Carex hystericina	Porcupine sedge			x	
Carex tumulicola	Foothill sedge				x
Castilleja pallescens var. inverta	Inverted pale paintbrush			x	
Caulanthus barnebyi	Barneby stemflower		x		
Caulanthus pilosus	Hairy wild cabbage			x	
Chaenactis cusickii	Cusick's false yarrow/Cusick's chaenactis			x	x
Chaenactis macrantha	Large-flowered chaenactis			x	
Chaenactis stevioides	Desert pincushion				x
Cleomella plocasperma	Alkali cleomella				x
Collomia renacta	Barren Valley collomia	x		x	
Coryphantha vivipara	Cushion cactus				x
Cryptantha humilis	Low cryptantha				
Cryptantha propria	Malheur cryptantha				
Cryptantha schoolcraftii	Schoolcraft catseye		x		
Cymopterus acaulis var. greeleyorum	Greeley's cymopterus/Greeley's wavewing			x	x
Cymopterus longipes ssp. Ibapensis	Ibapah wavewing				
Cyperus rivularis	Shining flatsedge				x
Damasonium californicum	Fringed waterplantain				x
Dimeresia howellii	Dimeresia				x
Downingia bacigalupii	Bacigalupi's downingia				x
Downingia insignis	Downingia				x
Dryopteris filix-mas	Male fern				
Eatonella nivea	White eatonella				x
Epipactis gigantea	Giant helleborine				x
Erigeron latus	Broad fleabane	x		x	
Eriogonum anemophilum	Windloving buckwheat		x		
Eriogonum argophyllum	Sulphur Springs buckwheat	x			
Eriogonum chrysops	Golden buckwheat			x	
Eriogonum crosbyae	Crosby buckwheat		x		

Scientific Name	Common Name	NVE[1]	NVH	OR	ID
Eriogonum lewisii	Lewis buckwheat	x			
Eriogonum ochrocephalum	Ochre-flowered buckwheat			x	
Eriogonum salicornioides	Playa buckwheat			x	
Eriogonum shockleyi var. packardiae	Packard's buckwheat				x
Eriogonum shockleyi var. shockleyi	Matted cowpie buckwheat				x
Glyptopleura marginata	White-margined wax plant				x
Hackelia cronquistii	Cronquist's stickseed			x	
Hackelia ophiobia	Rattlesnake stickseed/Three Fork's stickseed			x	x
Hackelia patens var. patens	Spreading stickseed			x	
Heliotropium curassavicum	Salt heliotrope			x	
Hymenoxys cooperi var. canescens	Cooper's goldenflower			x	
Ipomopsis polycladon	Spreading gilia				x
Ivesia rhypara var. rhypara	Grimy ivesia	x	x	x	
Ivesia shockleyi var. shockleyi	Shockley's ivesia			x	
Juncus torreyi	Torrey's rush			x	
Langloisia setosissima spp. punctata	Punctate langloisa			x	
Lathyrus grimesii	Grimes' vetchling	x			
Lepidium davisii	Davis' peppergrass	x		x	x
Lepidium montanum var. nevadense	Pueblo Valley peppergrass		x		
Lepidium papilliferum	Slick spot peppergrass				x
Leptodactylon glabrum	Bruneau River prickly phlox	x	x		x
Lipocarpha aristulata	Aristulate lipocarpha			x	
Lomatium foeniculaceum var. fimbriatum	Fringed desert-parsley			x	
Lomatium packardiae	Succor Creek parsley (Packards' desert parsley)		x	x	x
Lomatium ravenii	Raven's lomatium			x	
Lupinus biddlei	Biddle's lupine			x	
Lupinus uncialis	Inch-high lupine				x
Lygodesmia juncea	Rush-like skeletonweed			x	

Scientific Name	Common Name	NVE[1]	NVH	OR	ID
Malacothrix torreyi	Torrey's malacothrix			x	
Melica stricta	Nodding melic			x	
Mentzelia mollis	Smooth stickleaf/Smooth mentzelia		x	x	x
Mentzelia packardiae	Packard stickleaf/Packard's mentzelia	x		x	
Mirabilis bigelovii var. retrorsa	Bigelow's four-o'clock			x	
Muhlenbergia minutissima	Annual dropseed			x	
Nemacladus rigidus	Rigid threadbush				x
Oryctes nevadensis	Oryctes		x		
Oxytropis sericea var. sericea	White locoweed			x	
Pediocactus simpsonii	Simpson's hedgehog cactus			x	x
Penstemen floribundus	Cordelia beardtongue		x		
Penstemon janishiae	Janish's penstomen			x	x
Penstemon kingii	King's penstemon			x	
Penstemon perpulcher	Beautiful penstemon			x	
Penstemon pratensis	White-flowered penstemon			x	
Penstemon seorsus	Short-lobed penstemon			x	
Penstomen procerus var. modestus	Small flower beardtongue	x			
Peteria thompsoniae	Spine-noded milkvetch				x
Phacelia gymnoclada	Naked-stemmed phacelia			x	
Phacelia inundata	Playa phacelia		x		
Phacelia lutea var. calva	Malheur yellow phacelia				x
Phacelia lutea var. mackenzieorum	Mackenzie's phacelia			x	
Phacelia minutissima	Least phacelia	x			x
Physaria chambersii	Chambers twinpod			x	
Plantago eriopoda	Hairy-foot plantain			x	
Polystichum kruckebergii	Kruckeberg's holly fern			x	
Potentilla basaltica	Soldier Meadow cinquefoil		x		
Potentilla cottamii	Cottam cinquefoil	x			
Primula capillaris	Ruby Mountains primrose	x			
Psathyrotes annua	Annual brittlebrush				x
Psorothamnus kingii	Lahontan indigobush		x		
Pyrrocoma radiata	Snake River goldenweed			x	
Rafinesquia californica	California chicory			x	

Scientific Name	Common Name	NVE[1]	NVH	OR	ID
Senecio ertterae	Ertter's senecio			x	
Silene nachlingerae	Nachlinger catchfly	x			
Smelowskia holmgrenii	Holmgren smelowskia		x		
Stanleya confertiflora	Biennial princesplume/Biennial stanleya			x	x
Stylocline filaginea	Stylocline				x
Stylocline psilocarphoides	Malheur stylocline			x	
Teucrium canadense var. occidentale	American wood sage				x
Thelypodium howellii spp. spectabilis	Howell's spectacular thelypody			x	
Trifolium leibergii	Leiberg clover	x			
Trifolium owyheense	Owyhee clover			x	x
Viola lithion	Rock violet	x			
Lichens					
Aspicilia fruticulosa	Rim Lichen		x		
Catapyrenium congestum	(no common name)				x

[1]ID = Idaho Conservation Data Center
NVH = Nevada Natural Heritage Program Humboldt County
NVE = Nevada Natural Heritage Program Elk County
OR = Oregon Natural Heritage Program

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