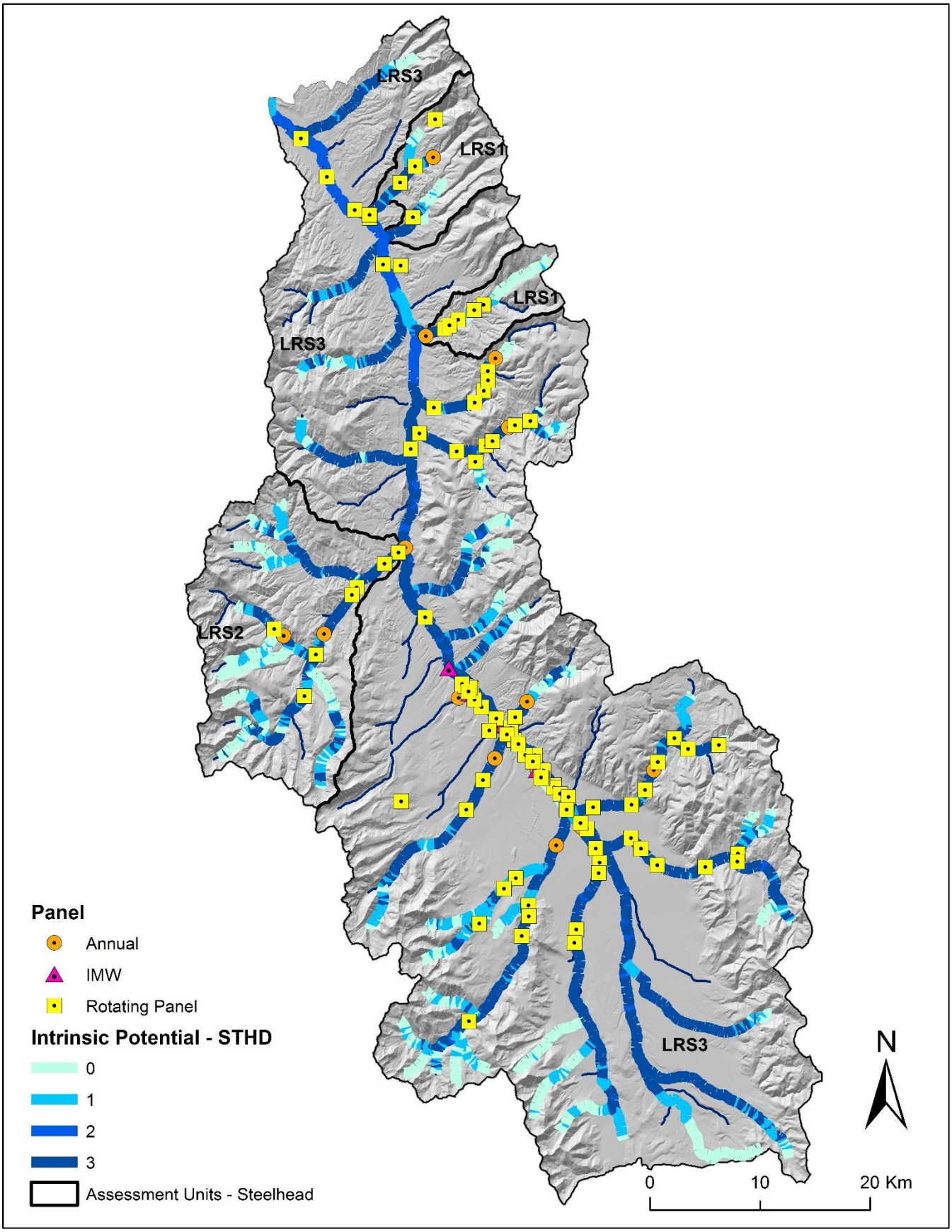
Lemhi: Summary of CHaMP Metrics and Modeled Products

- CHaMP metrics are directly measured at each CHaMP site according to probabilistic sampling design. Metric included in this summary are:
  - Sinuosity
  - Substrate < 2 mm
  - Substrate < 6 mm
- Modeled products are built from CHaMP data and additional mechanistic or empirical knowledge, assessed at each CHaMP Site
  - Habitat Suitability Index (HSI)
  - Net Rate of Energy Investment (NREI)
  - Quantile Regression Forest (QRF)
- Modeled products built from regional spatial data layers and mechanistic models.
  - Riparian Condition Assessment (RCA)
  - Riparian Vegetation Departure (RVD)
  - Riparian Vegetation Conversion Type (RVCT)
- Modeled products built from CHaMP data and remotely sensed land surface temperature data
  - Stream Temperature Exceedence (TE)

Summary by Chinook Assessment Unit

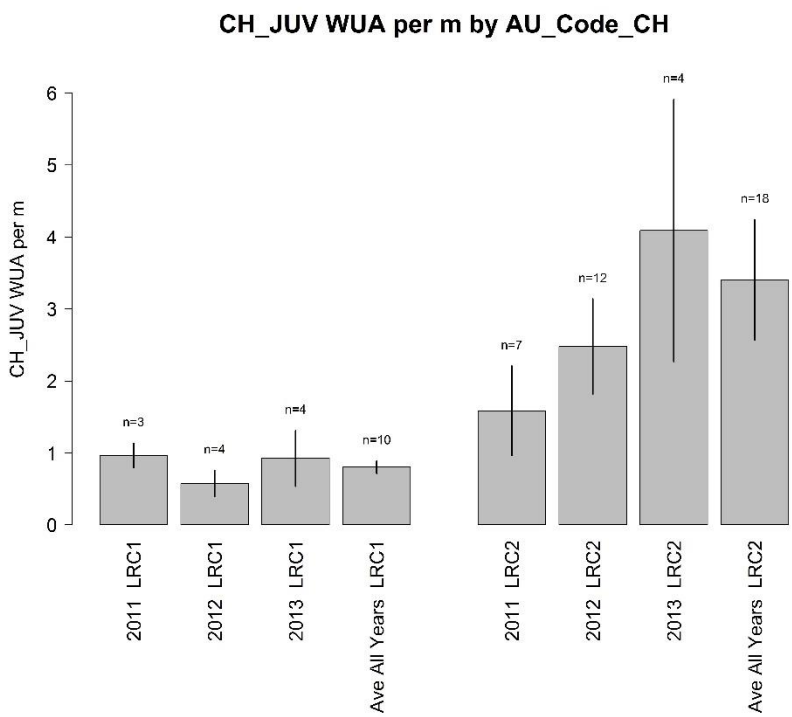
Lemhi: Summary of CHaMP Metrics and Modeled Products

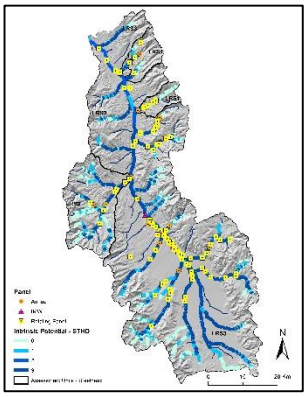
Chinook Intrinsic Potential



Chinook Juvenile Weighted Usable Area

- Source: Habitat Suitability Index (HSI) Model
- Definition: Suitable habitat area (m^2) per meter of stream length for Juvenile Chinook





Sub Population	Visit Year	N	Mean	St Dev
All.Sites	2011	20	1.178	0.733
	2012	38	1.566	1.255
	2013	19	2.428	2.102
	2014	3	0.236	0.076
	Average of All Years	70	1.648	1.791
LRC1	2011	3	0.966	0.154
	2012	4	0.576	0.207
	2013	4	0.926	0.428
	Average of All Years	10	0.803	0.351
LRC2	2011	7	1.585	0.722
	2012	12	2.479	1.243
	2013	4	4.09	1.915
	Average of All Years	18	3.405	1.793

Chinook Juvenile Weighted Usable Area

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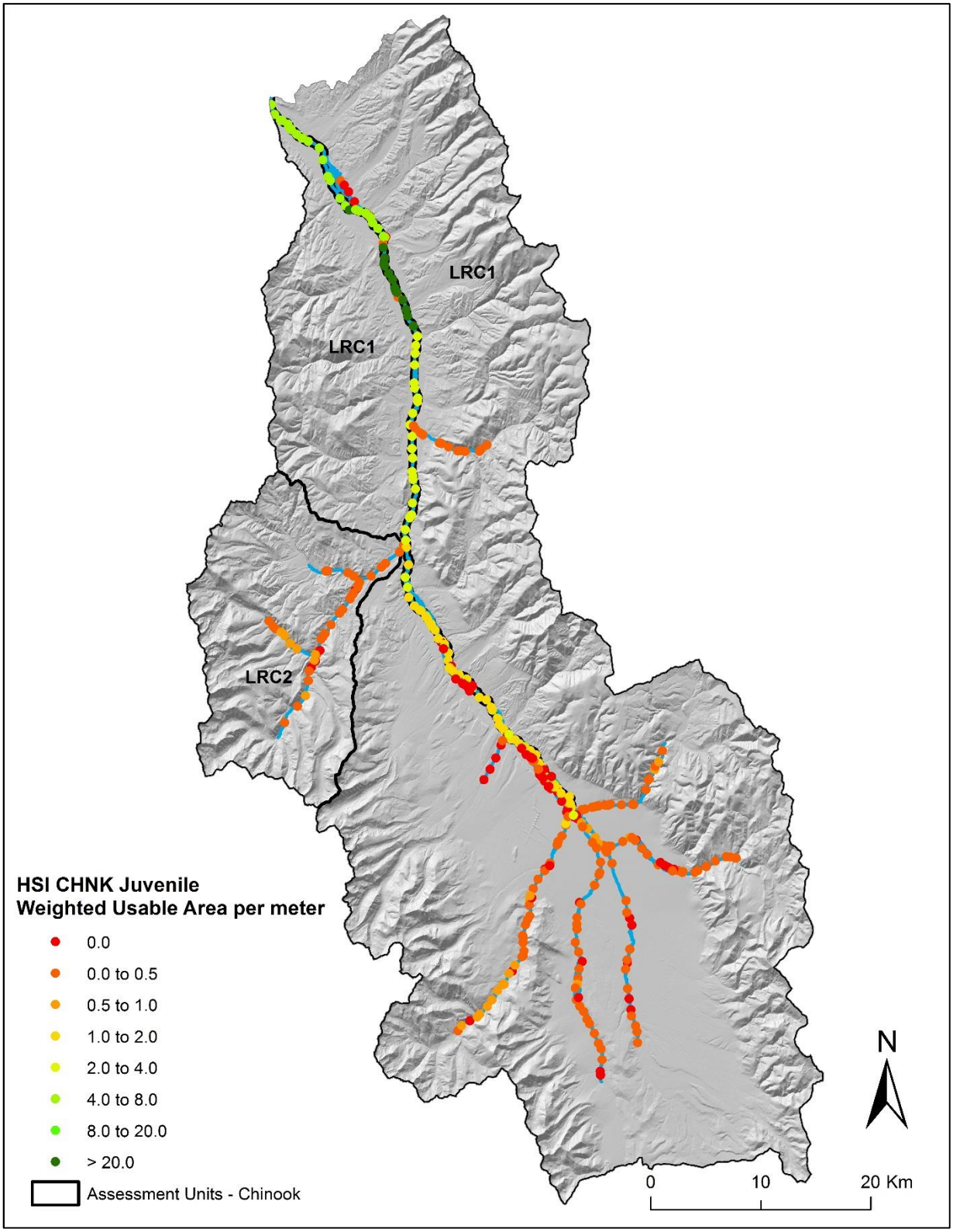
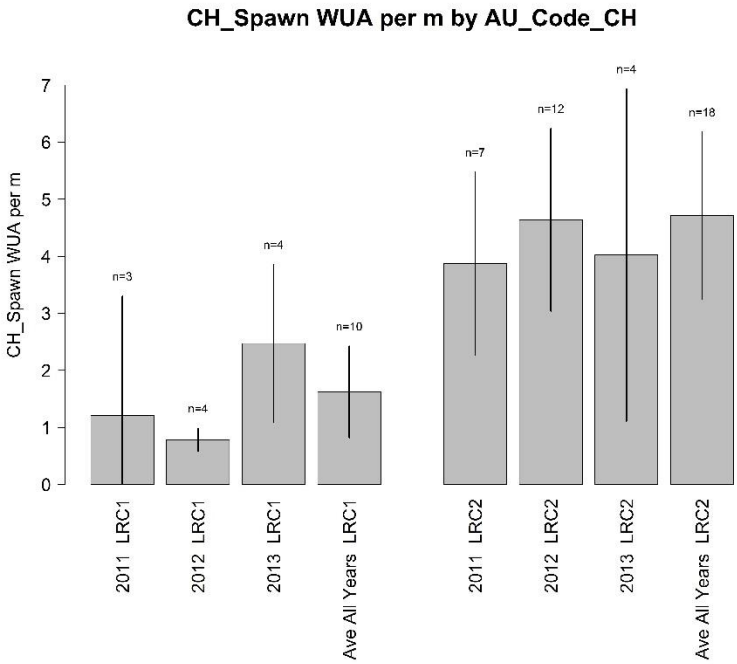
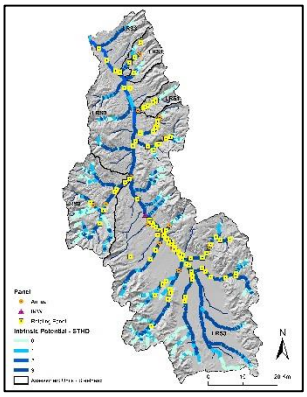


Chinook Spawner Weighted Usable Area

- Source: Habitat Suitability Index (HSI) Model
- Definition: Suitable Spawning habitat area (m^2) per meter of stream length for Chinook





Sub Population	Visit Year	N	Mean	St Dev
	2011	20	2.642	2.014
	2012	38	2.685	2.811
	2013	19	2.625	2.625
	2014	3	0.611	0.384
All.Sites	Average of All Years	70	2.331	2.611
	2011	3	1.211	1.976
	2012	4	0.784	0.225
	2013	4	2.472	1.543
LRC1	Average of All Years	10	1.623	1.758
	2011	7	3.876	1.822
	2012	12	4.641	3.003
	2013	4	4.023	2.992
LRC2	Average of All Years	18	4.715	2.679

Chinook Spawner Weighted Usable Area

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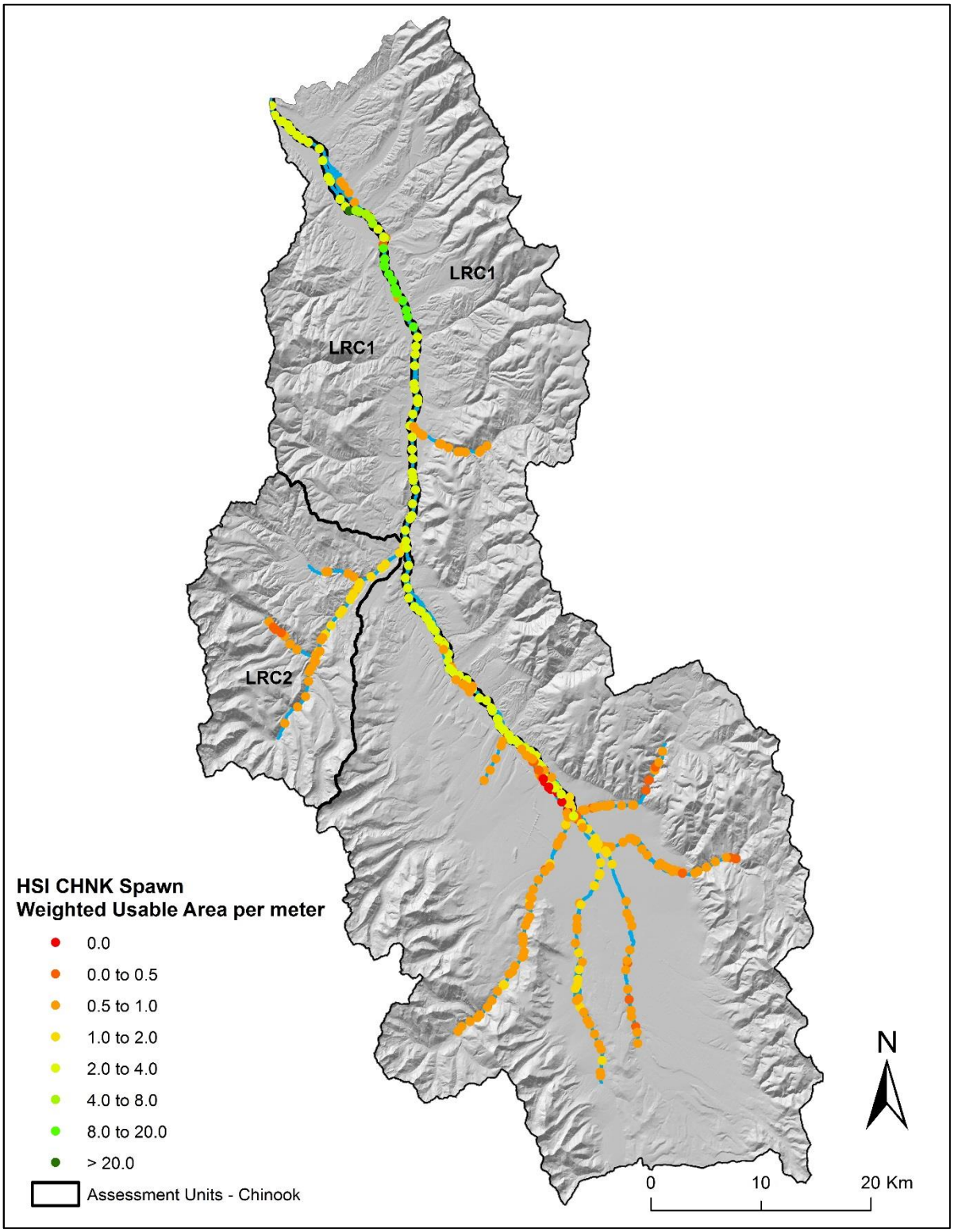
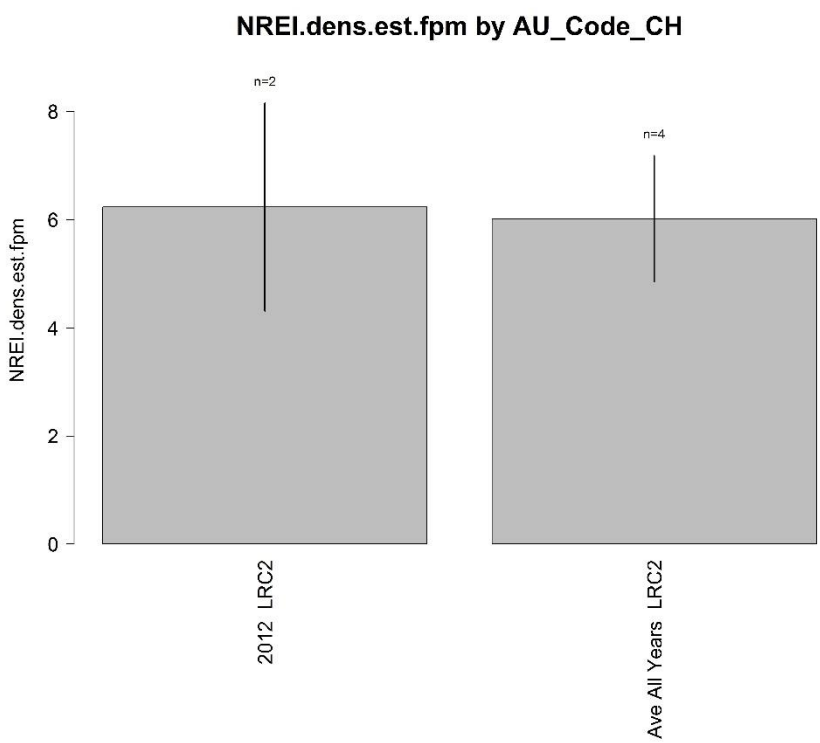
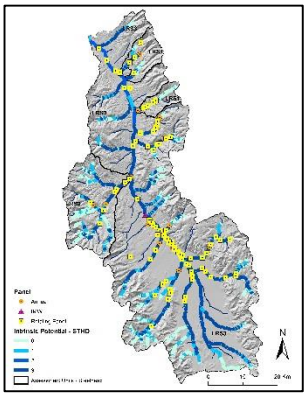


Juvenile Salmonid Capacity

- Source: Net Rate of Energy Intake (NREI) Model
- Definition: Carrying capacity (fish) per meter of stream length





Sub Population	Visit Year	N	Mean	St Dev
All.Sites	2011	3	2.585	1.532
	2012	8	4.884	2.065
	Average of All Years	13	3.697	2.063
LRC2	2012	2	6.234	1.201
	Average of All Years	4	6.017	1.139

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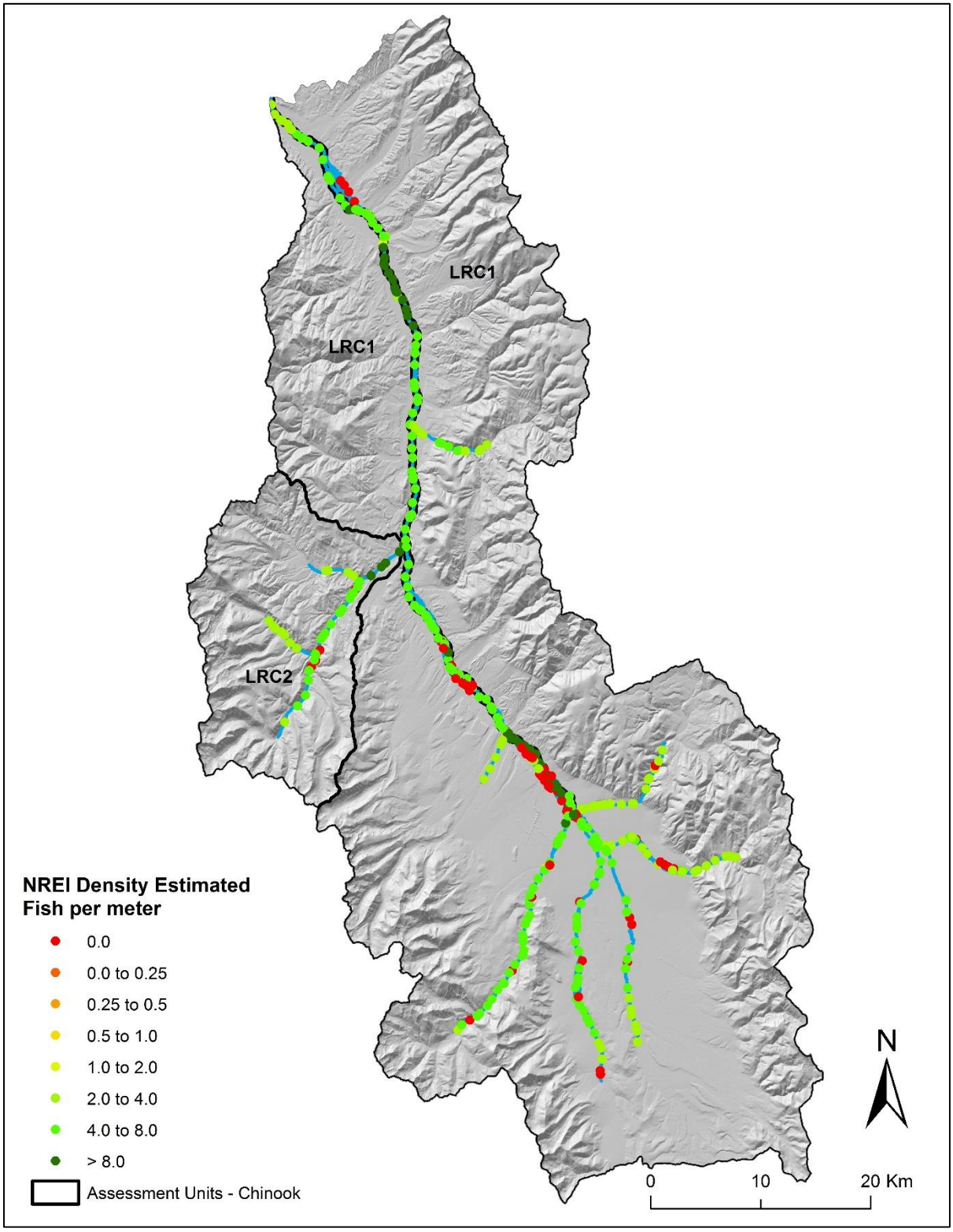
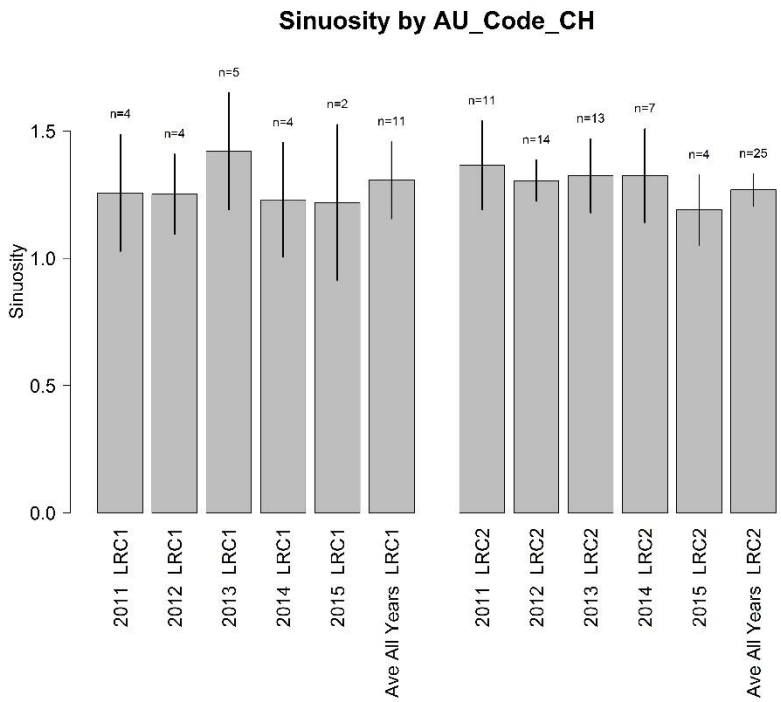
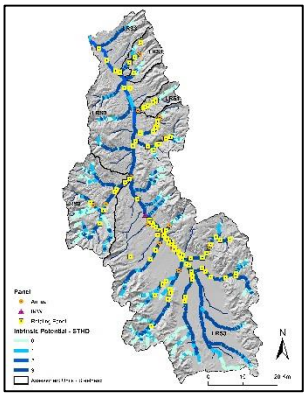


Sinuosity

- Source: CHaMP Metrics (www.champmonitoring.org)
- Definition: Ratio of the thalweg length to the straight line distance between the start and end points of the thalweg.





Sub Population	Visit Year	N	Mean	St Dev
	2011	31	1.309	0.27
	2012	40	1.307	0.231
	2013	32	1.308	0.282
	2014	21	1.273	0.232
	2015	18	1.264	0.258
All.Sites	Average of All Years	83	1.248	0.233
	2011	4	1.257	0.24
	2012	4	1.252	0.16
	2013	5	1.42	0.287
	2014	4	1.23	0.238
	2015	2	1.219	0.163
LRC1	Average of All Years	11	1.307	0.271
	2011	11	1.365	0.304
	2012	14	1.305	0.188
	2013	13	1.324	0.296
	2014	7	1.324	0.288
	2015	4	1.19	0.138
LRC2	Average of All Years	25	1.269	0.242

Sinuosity

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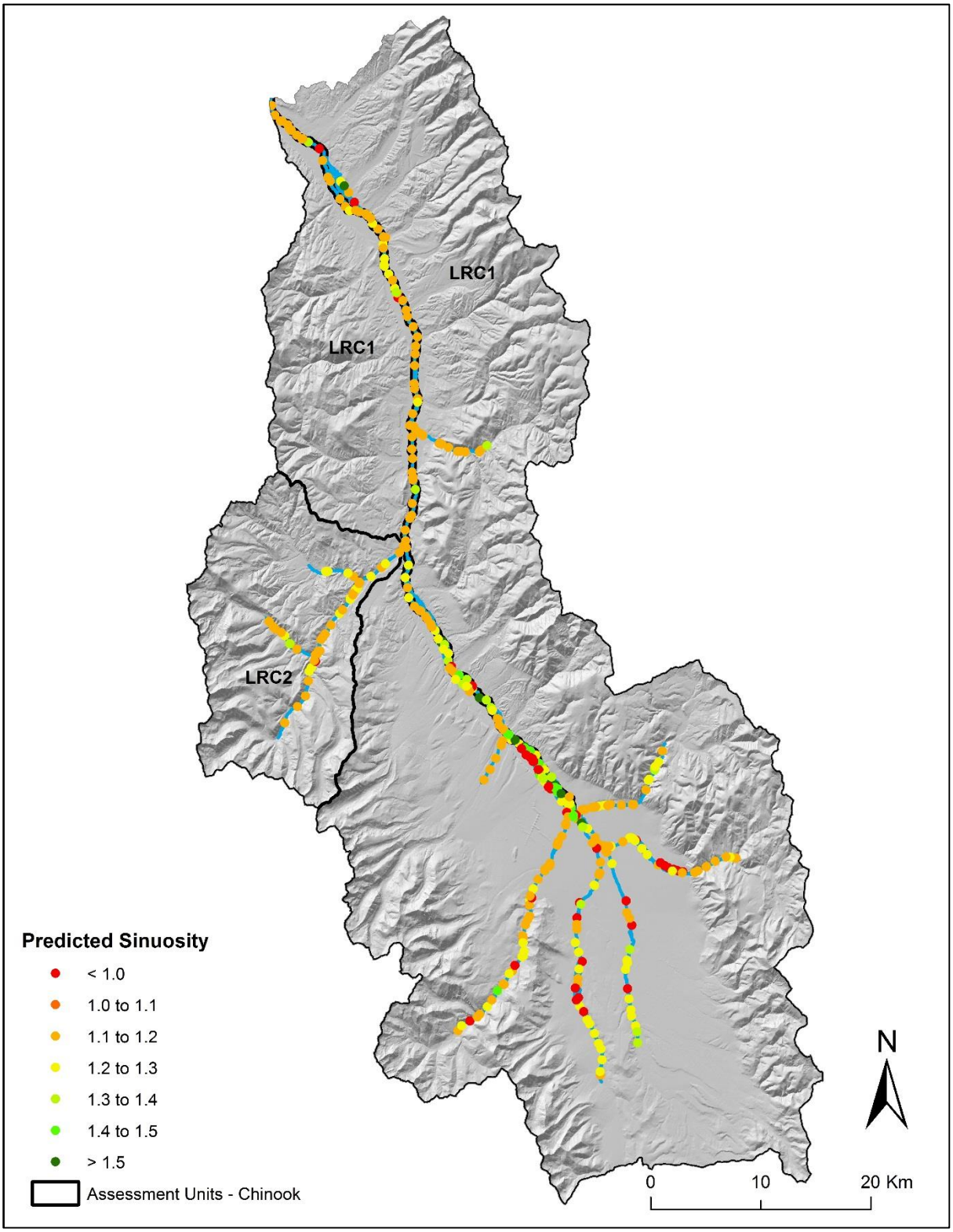
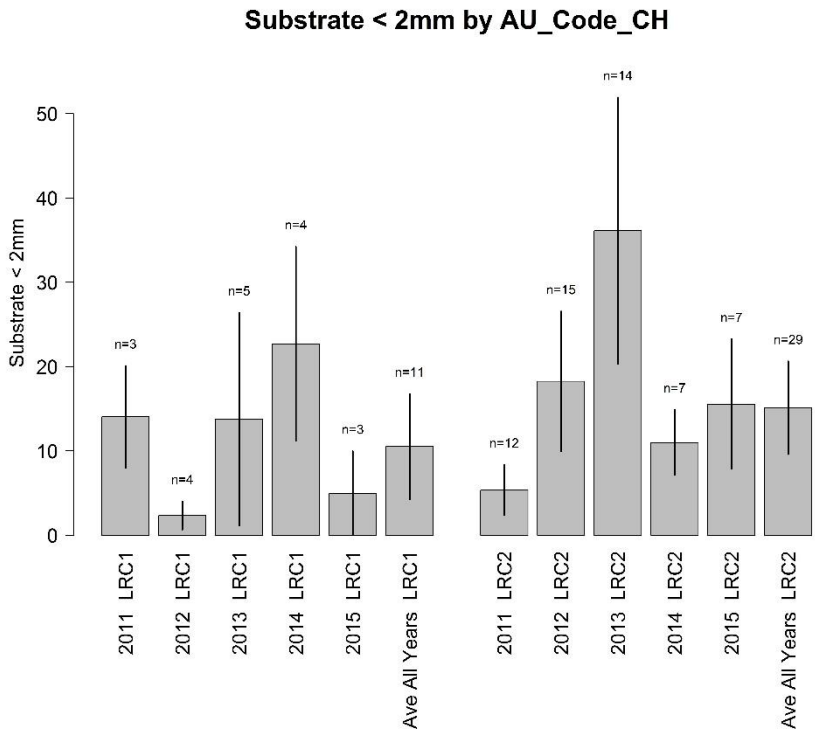
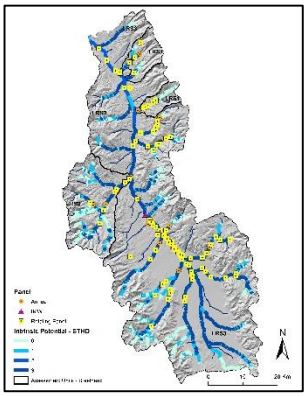


Substrate < 2 mm

- Source: CHaMP Metrics (www.champmonitoring.org)
- Definition: Average percentage of pool tail substrates comprised of fine sediment <2 mm

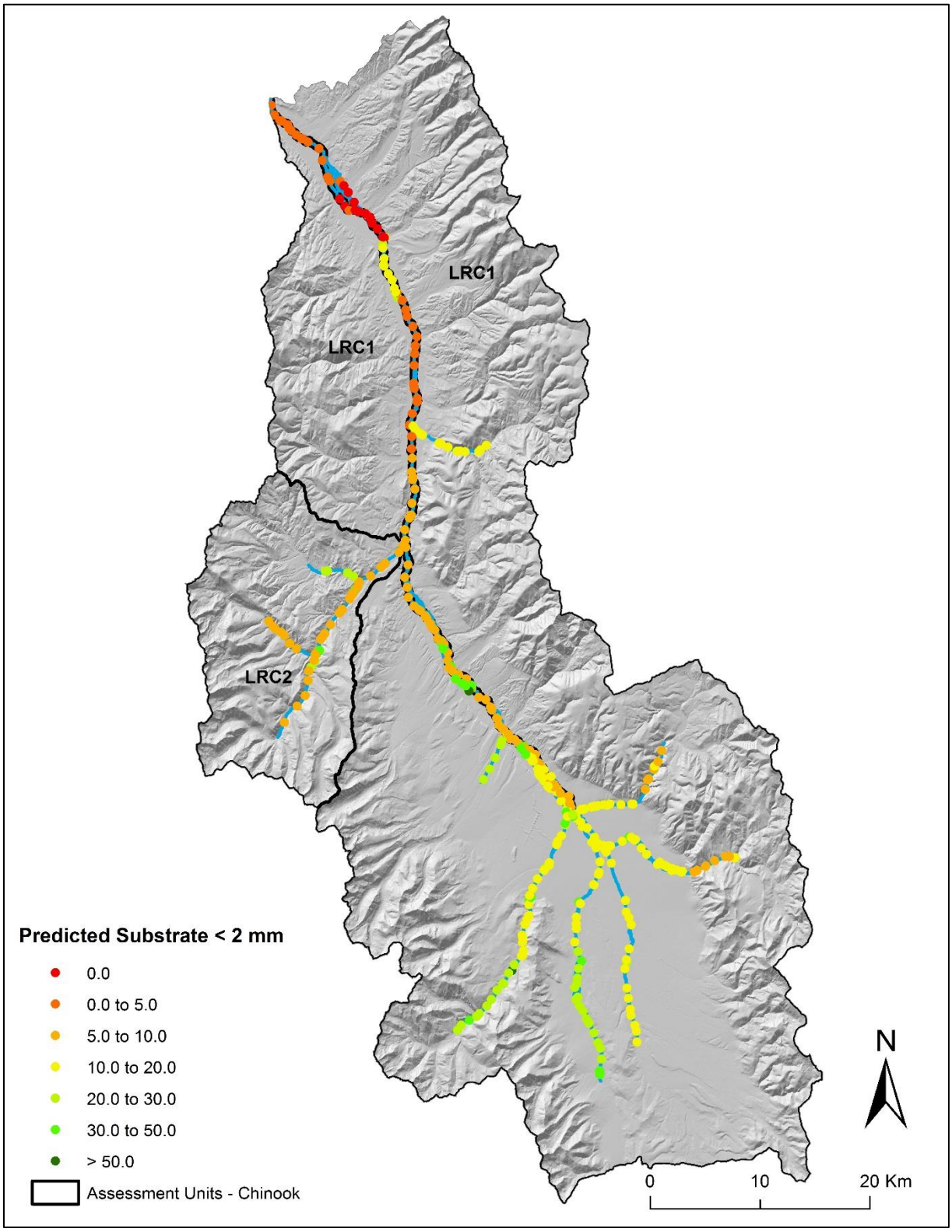




Sub Population	Visit Year	N	Mean	St Dev
	2011	26	8.919	10.432
	2012	41	19.84	23.804
	2013	35	30.58	29.154
	2014	22	14.779	10.949
	2015	21	18.214	16.344
All.Sites	Average of All Years	88	21.52	26.049
	2011	3	14.059	5.678
	2012	4	2.356	1.702
	2013	5	13.765	14.632
	2014	4	22.718	12.438
	2015	3	4.941	4.542
LRC1	Average of All Years	11	10.526	11.671
	2011	12	5.372	6.321
	2012	15	18.272	19.379
	2013	14	36.131	33.712
	2014	7	11.019	6.619
	2015	7	15.571	10.626
LRC2	Average of All Years	29	15.133	18.991

Substrate < 2 mm

- Source: CHaMP Metrics (www.champmonitoring.org)
- Definition: Average percentage of pool tail substrates comprised of fine sediment <2 mm



Substrate < 6 mm

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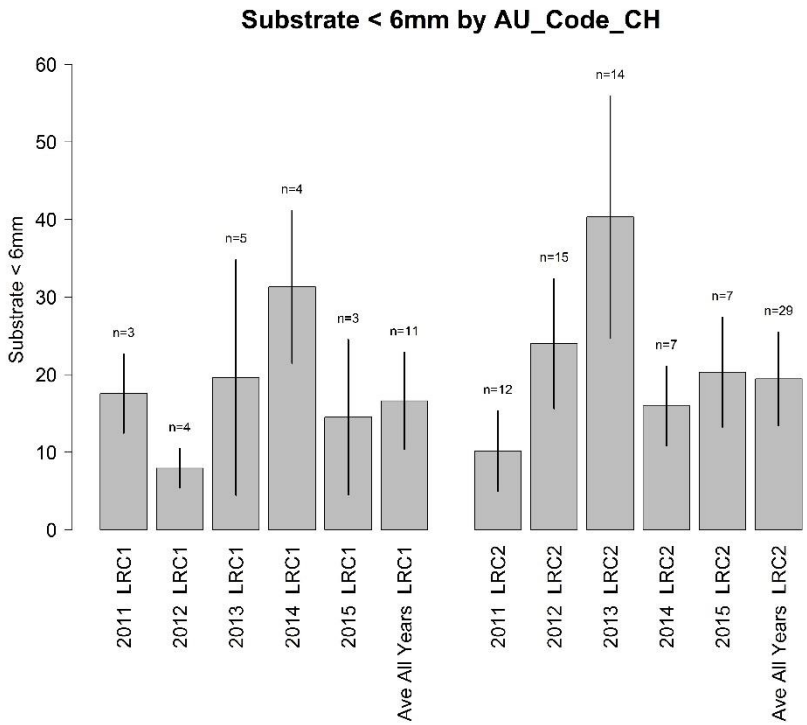

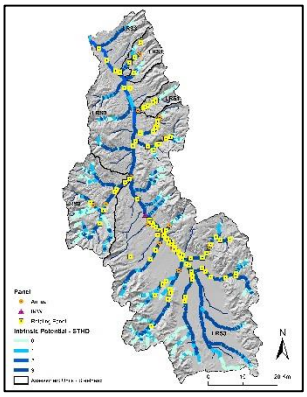

Sub Population	Visit Year	N	Mean	St Dev
	2011	26	14.012	12.918
	2012	41	27.035	24.977
	2013	35	37.167	28.663
	2014	22	23.094	13.519
	2015	21	26.399	15.951
All.Sites	Average of All Years	88	28.163	25.892
	2011	3	17.568	5.016
	2012	4	7.937	2.523
	2013	5	19.649	17.446
	2014	4	31.303	11.247
	2015	3	14.505	9.656
LRC1	Average of All Years	11	16.624	12.661
	2011	12	10.132	9.816
	2012	15	24.002	19.724
	2013	14	40.316	33.483
	2014	7	15.963	8.54
	2015	7	20.32	9.526
LRC2	Average of All Years	29	19.45	19.832

Substrate < 6 mm

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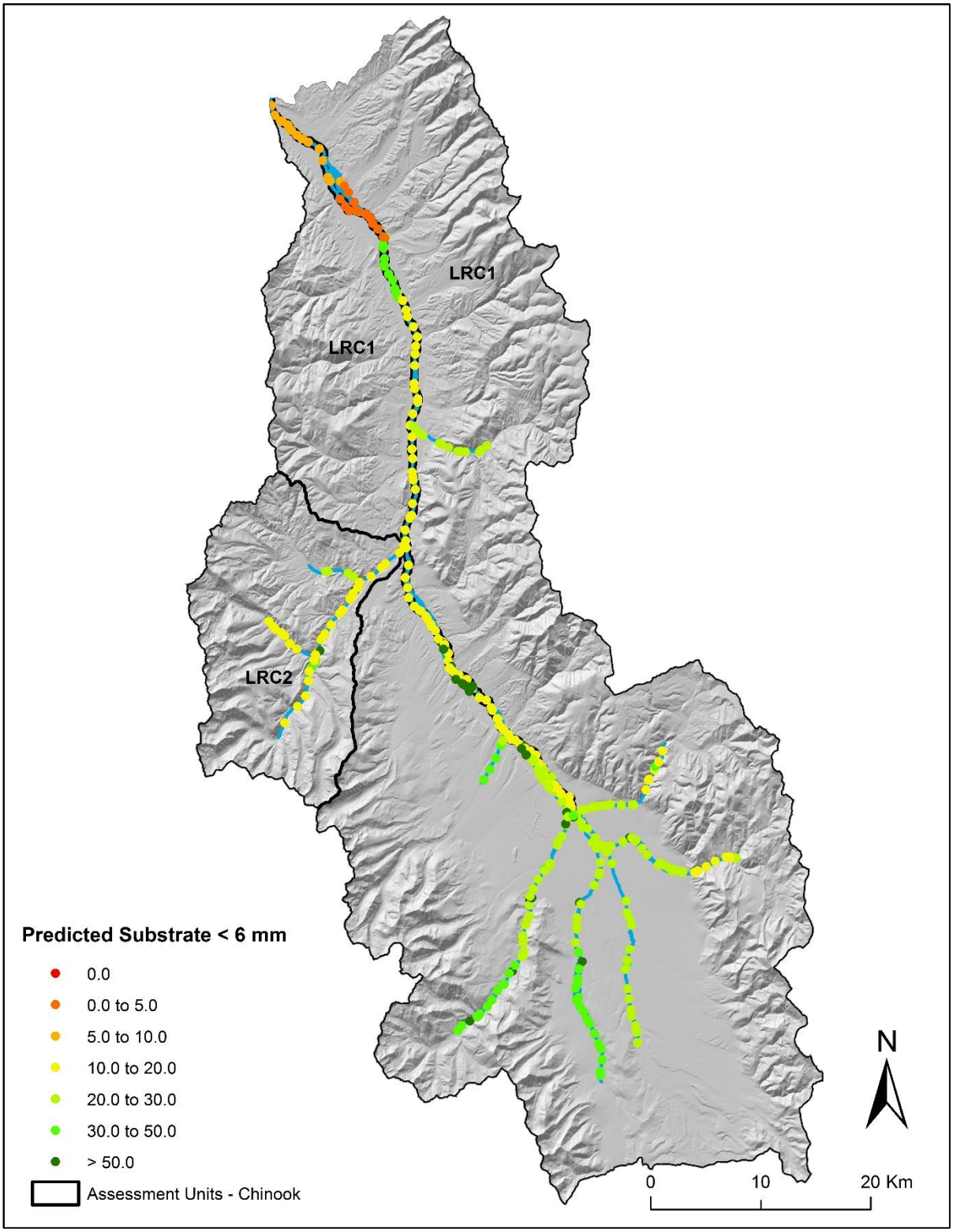
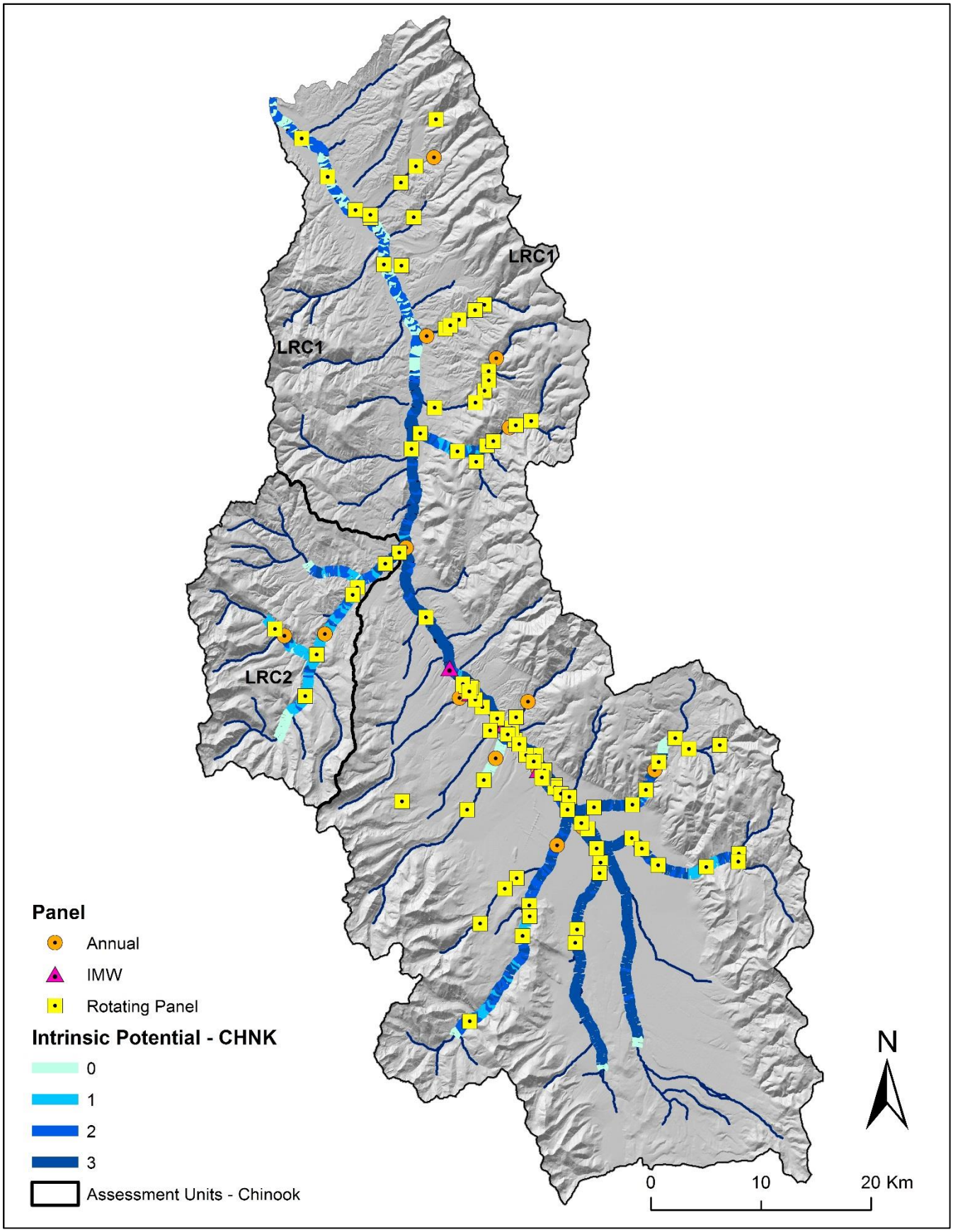


Summary by Steelhead Assessment Unit

Lemhi: Summary of CHaMP Metrics and Modeled Products

Steelhead Intrinsic Potential



Steelhead Juvenile Weighted Usable Area

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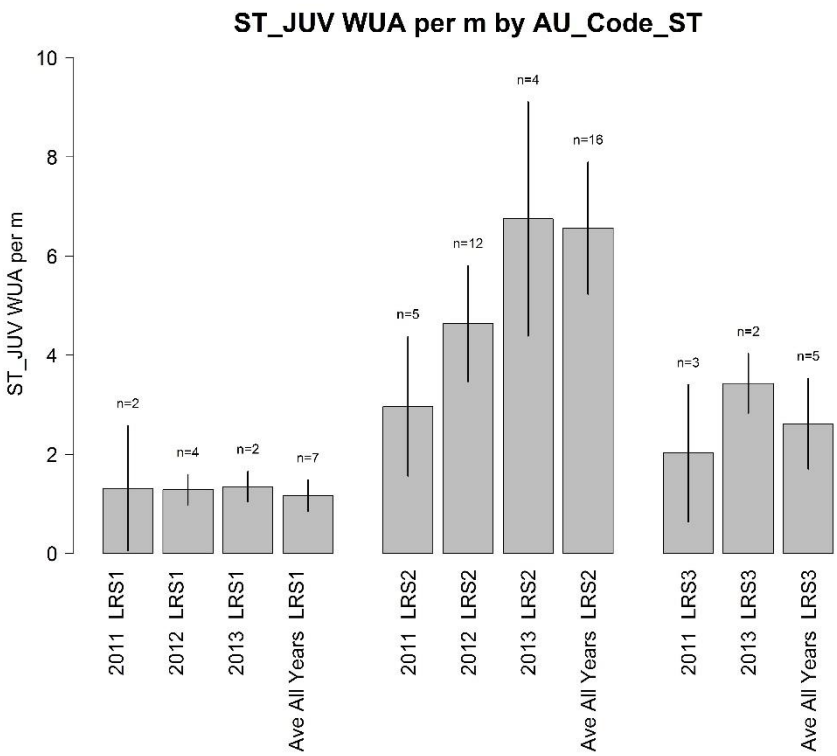
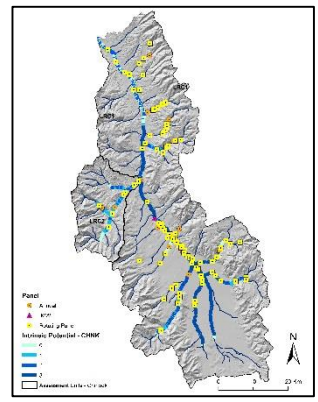
- Definition: Suitable habitat area (m^2) per meter of stream length for Juvenile Steelhead





Sub Population	Visit Year	N	Mean	St Dev
	2011	20	2.196	1.312
	2012	38	2.998	2.233
	2013	19	4.294	3.057
	2014	3	0.811	0.259
All.Sites	Average of All Years	70	3.211	3.17
	2011	2	1.314	0.645
	2012	4	1.289	0.339
	2013	2	1.35	0.156
LRS1	Average of All Years	7	1.164	0.401
	2011	5	2.966	1.287
	2012	12	4.639	2.074
	2013	4	6.749	2.529
LRS2	Average of All Years	16	6.567	2.975
	2011	3	2.023	0.997
	2013	2	3.432	0.306
LRS3	Average of All Years	5	2.62	1.042

Steelhead Juvenile Weighted Usable Area

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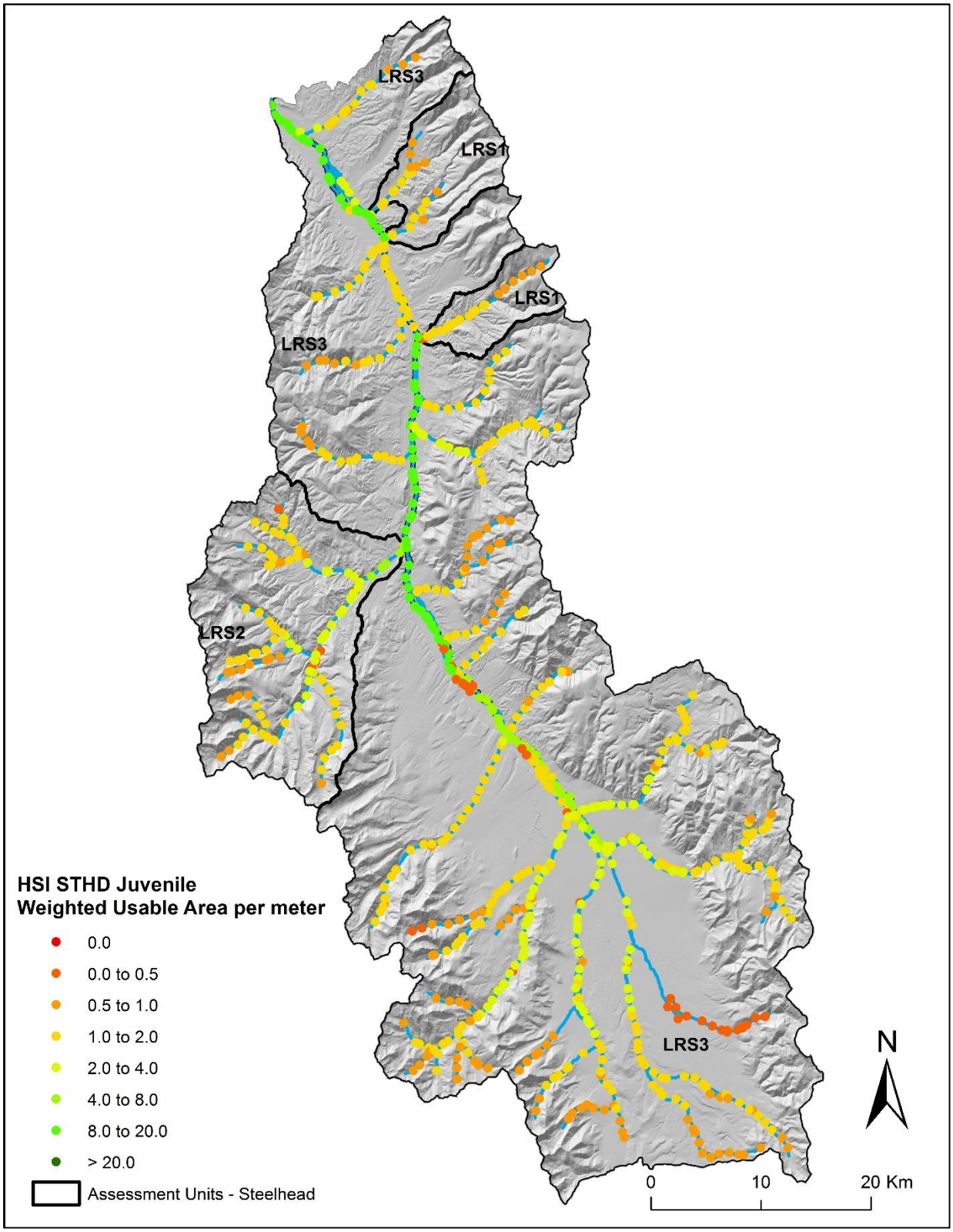
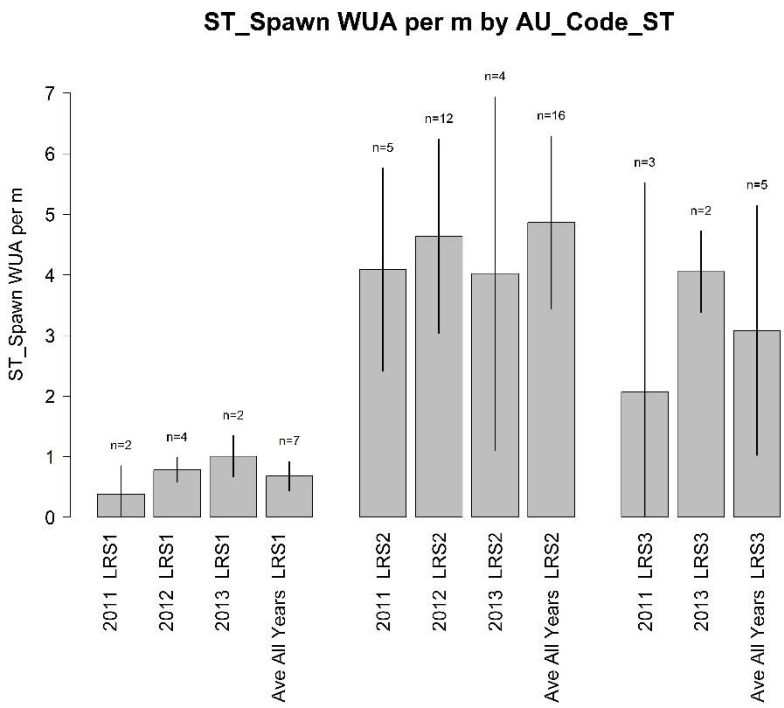
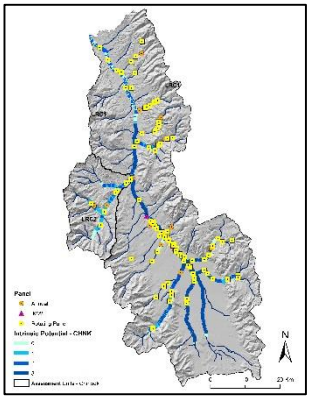


Steelhead Spawner Weighted Usable Area

- Source: Habitat Suitability Index (HSI) Model
- Definition: Suitable Spawning habitat area (m^2) per meter of stream length for Steelhead





Sub Population	Visit Year	N	Mean	St Dev
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	2012	38	2.685	2.811
	2013	19	2.624	2.625
	2014	3	0.61	0.383
All.Sites	Average of All Years	70	2.33	2.611
	2011	2	0.381	0.238
	2012	4	0.783	0.224
	2013	2	1.009	0.171
LRS1	Average of All Years	7	0.679	0.358
	2011	5	4.087	1.625
	2012	12	4.64	3.004
	2013	4	4.023	2.992
LRS2	Average of All Years	16	4.866	2.605
	2011	3	2.066	2.491
	2013	2	4.053	0.34
LRS3	Average of All Years	5	3.085	2.281

Steelhead Spawner Weighted Usable Area

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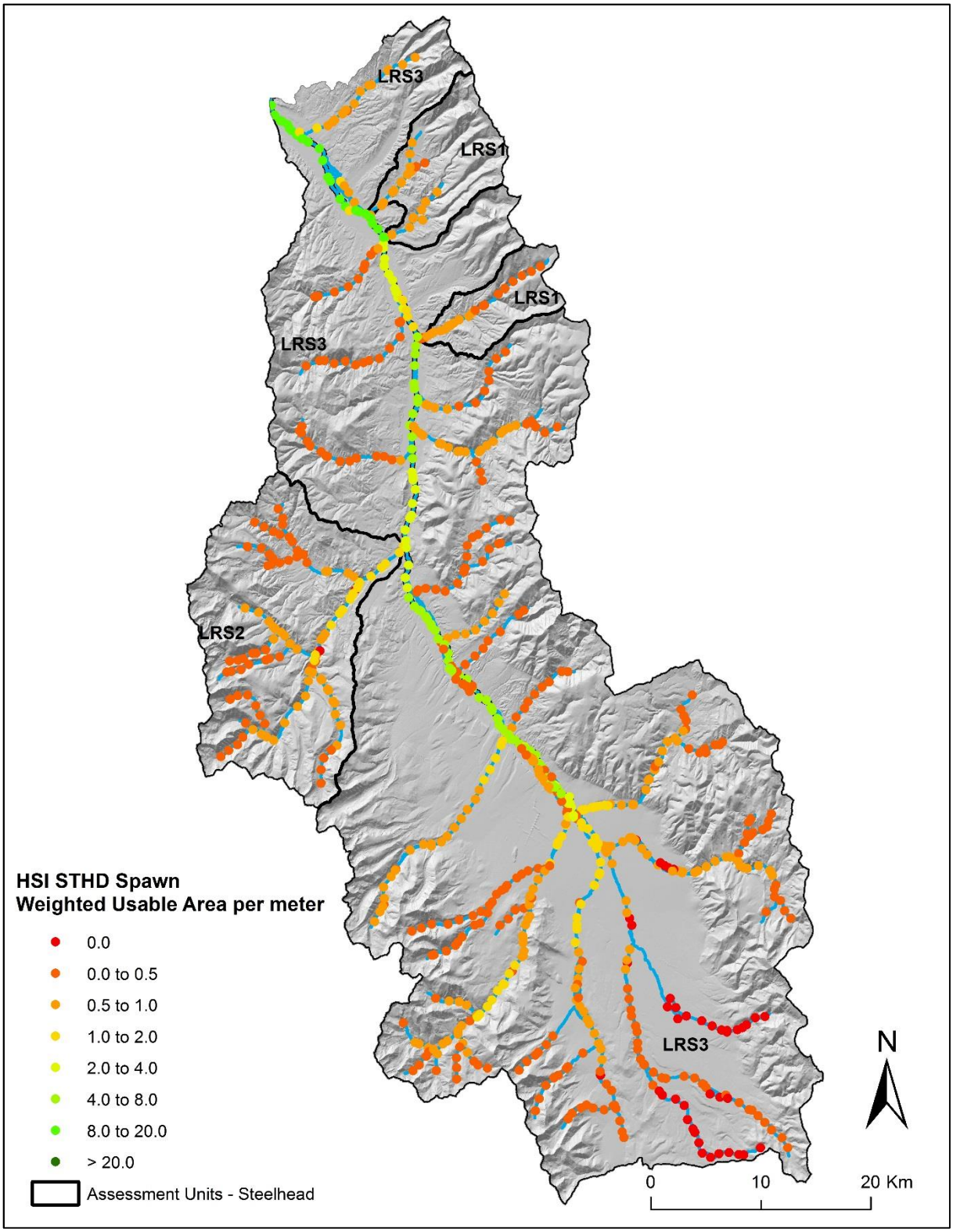

Juvenile Salmonid Capacity

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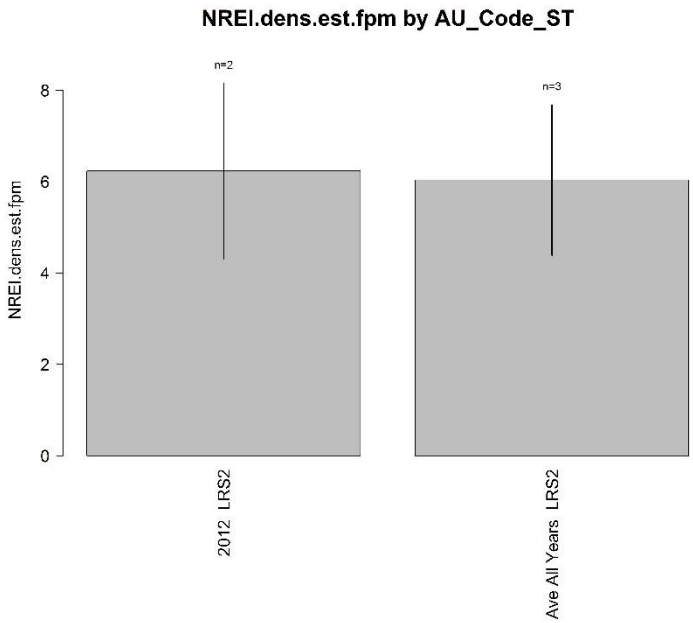

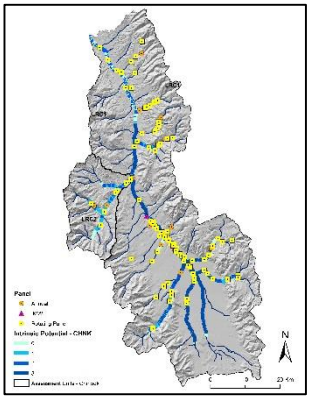

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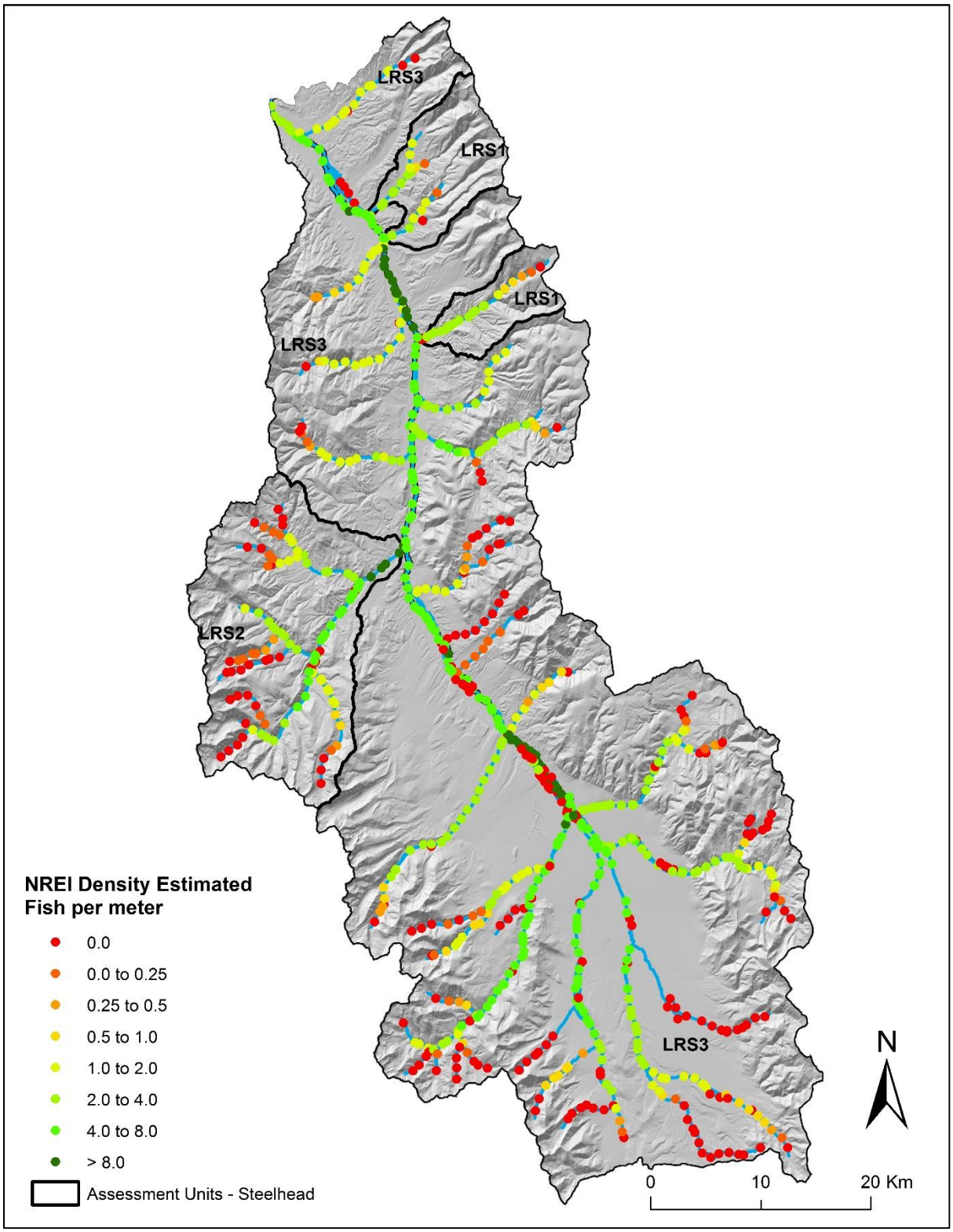

Sinuosity

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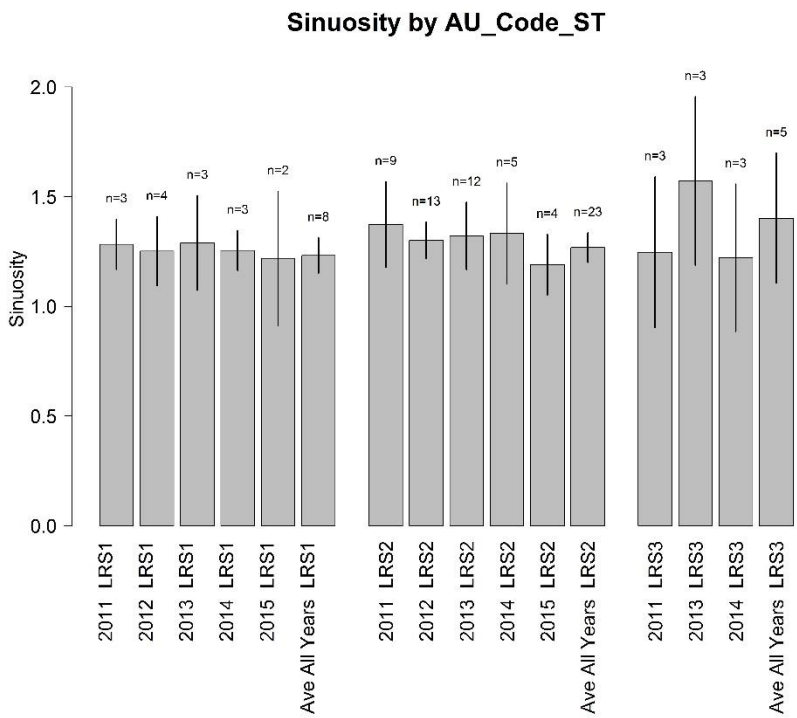

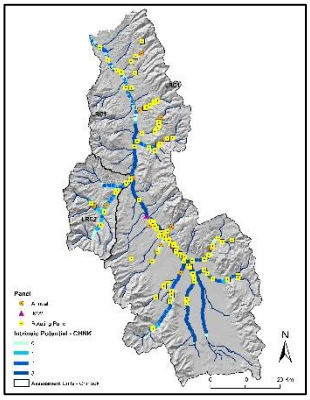

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	2012	4	1.252	0.16
	2013	3	1.289	0.155
	2014	3	1.255	0.069
	2015	2	1.219	0.163
LRS1	Average of All Years	8	1.232	0.127
	2011	9	1.374	0.316
	2012	13	1.301	0.19
	2013	12	1.321	0.299
	2014	5	1.332	0.302
	2015	4	1.19	0.138
LRS2	Average of All Years	23	1.268	0.246
	2011	3	1.247	0.258
	2013	3	1.571	0.277
	2014	3	1.222	0.256
LRS3	Average of All Years	5	1.402	0.331

Sinuosity

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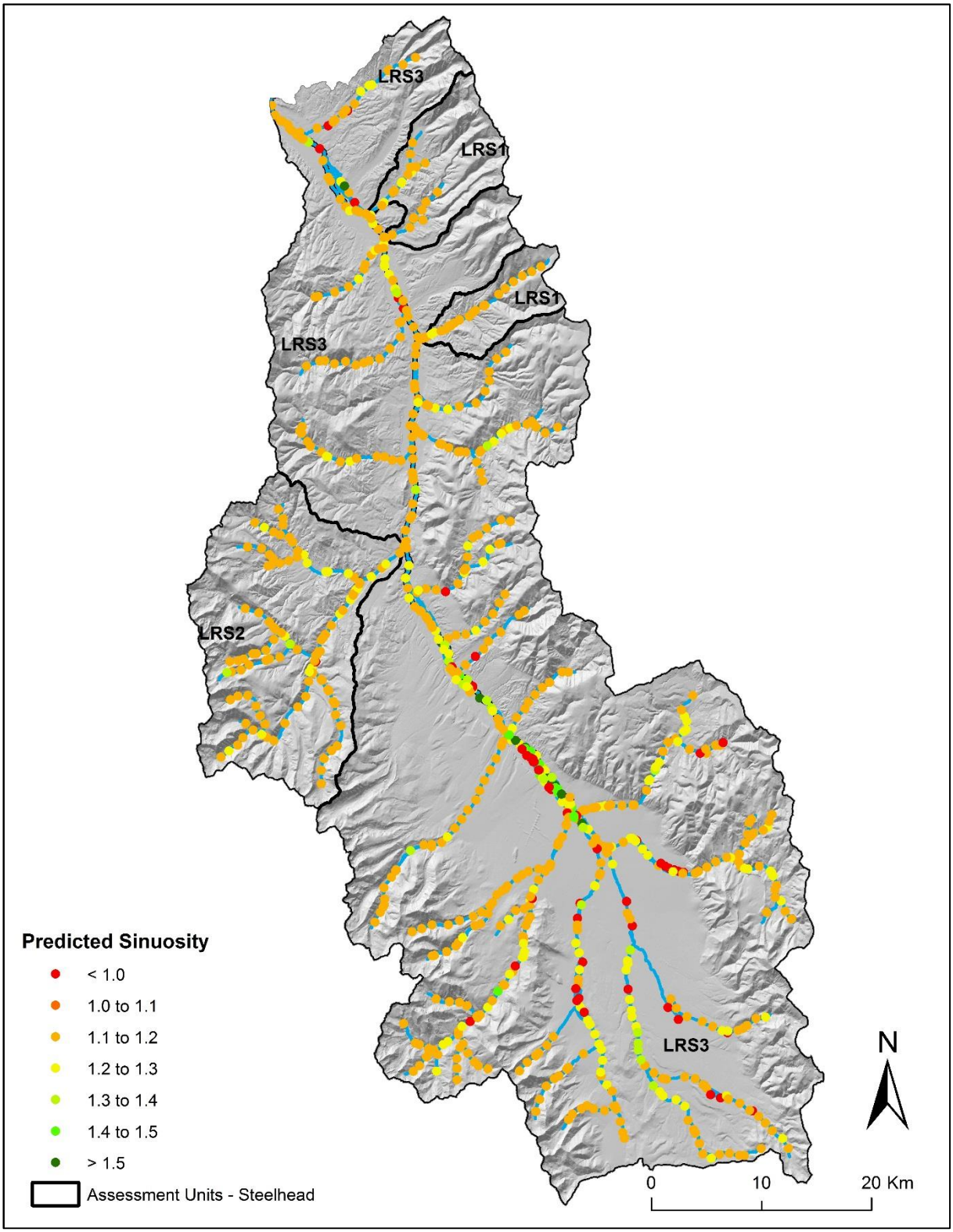
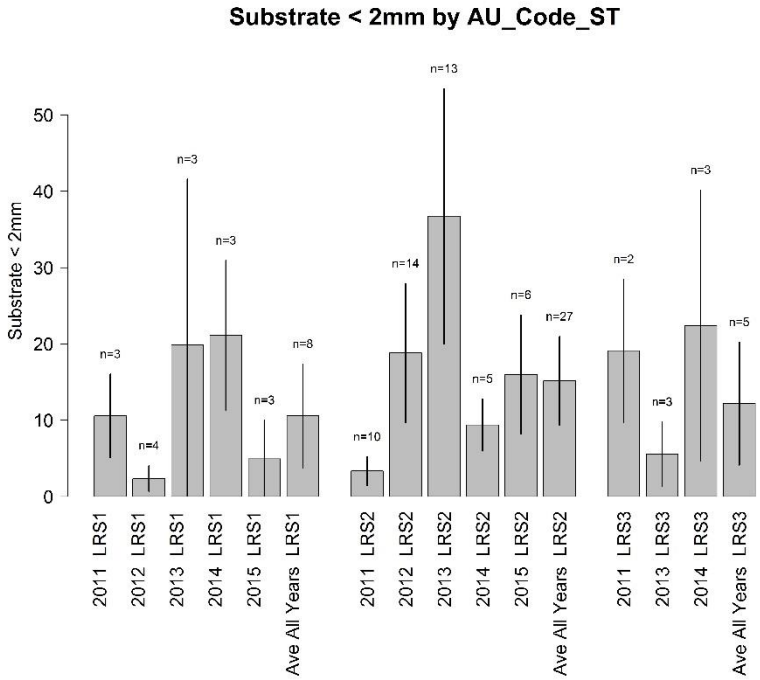
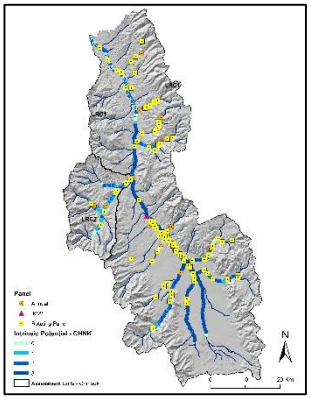


Substrate < 2mm

- Source: CHaMP Metrics (www.champmonitoring.org)
- Definition: Average percentage of pool tail substrates comprised of fine sediment <2 mm

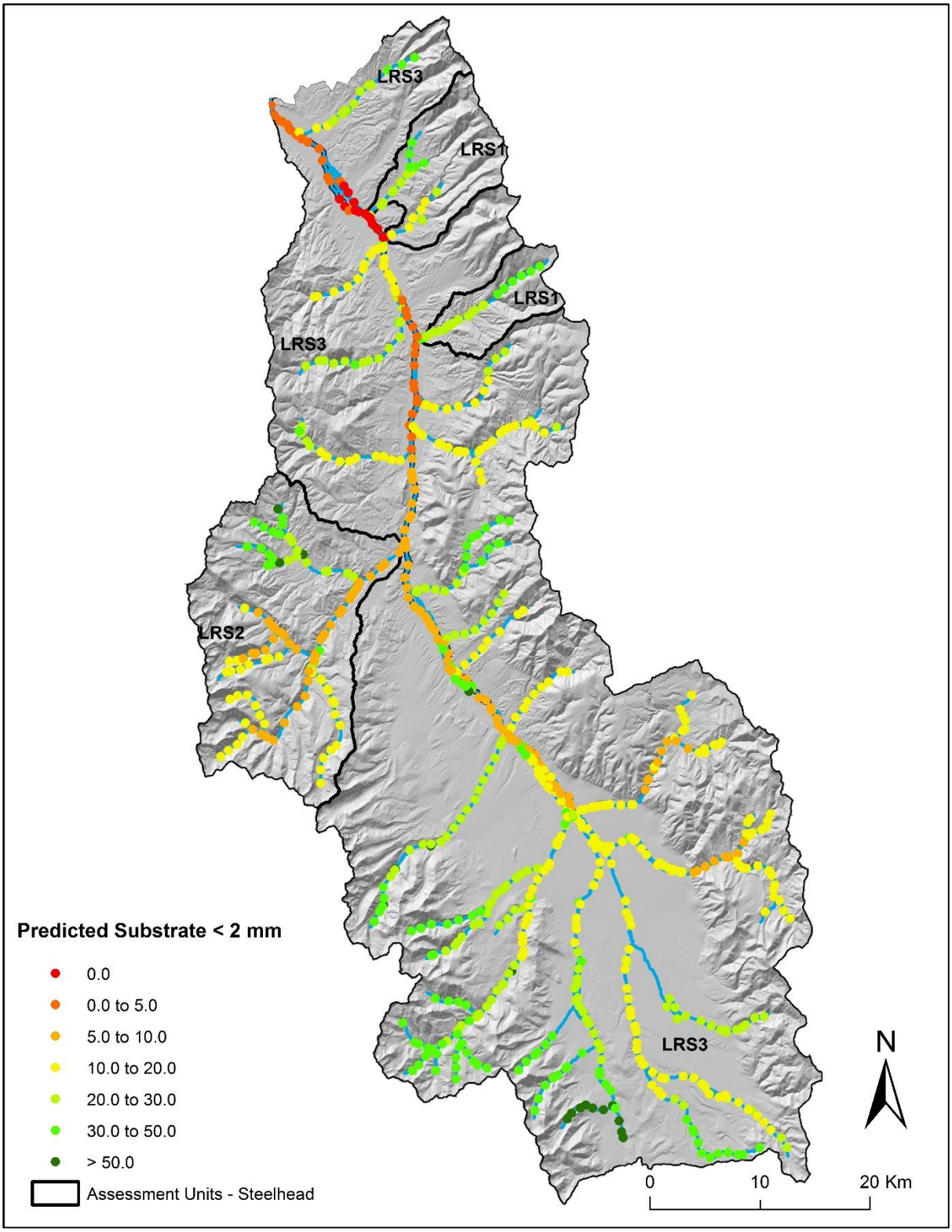




Sub Population	Visit Year	N	Mean	St Dev
	2011	26	8.919	10.432
	2012	41	19.84	23.804
	2013	35	30.58	29.154
	2014	22	14.779	10.949
	2015	21	18.214	16.344
All.Sites	Average of All Years	88	21.52	26.049
	2011	3	10.573	5.37
	2012	4	2.356	1.702
	2013	3	19.84	15.673
	2014	3	21.111	8.693
	2015	3	4.941	4.542
LRS1	Average of All Years	8	10.581	11.747
	2011	10	3.351	3.438
	2012	14	18.817	19.445
	2013	13	36.743	33.836
	2014	5	9.392	4.732
	2015	6	16.023	10.51
LRS2	Average of All Years	27	15.165	19.358
	2011	2	19.11	5.045
	2013	3	5.542	3.045
	2014	3	22.422	12.751
LRS3	Average of All Years	5	12.195	9.09

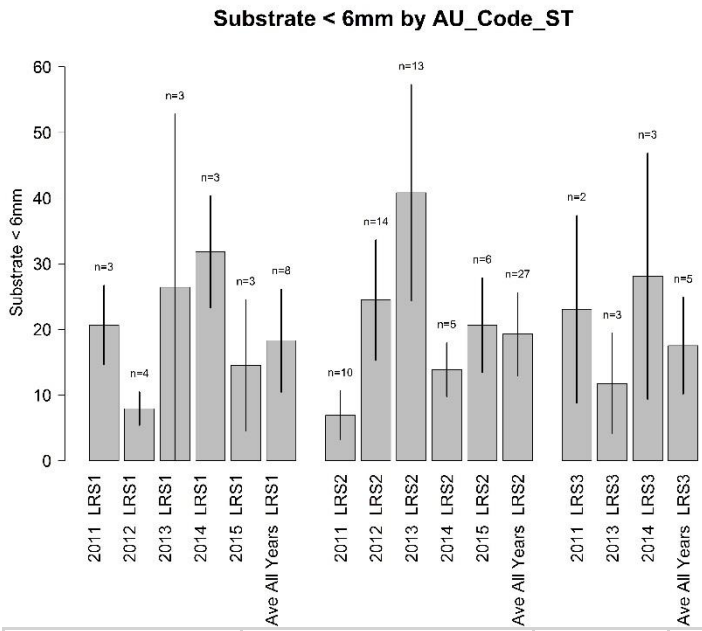
Substrate < 2mm

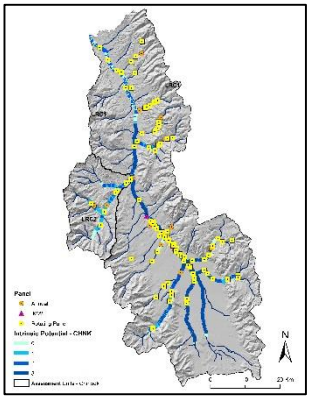
- Source: CHaMP Metrics (www.champmonitoring.org)
- Definition: Average percentage of pool tail substrates comprised of fine sediment <2 mm



Substrate < 6 mm

- Source: CHaMP Metrics (www.champmonitoring.org)
- Definition: Average percentage of pool tail substrates comprised of fine sediment <6 mm

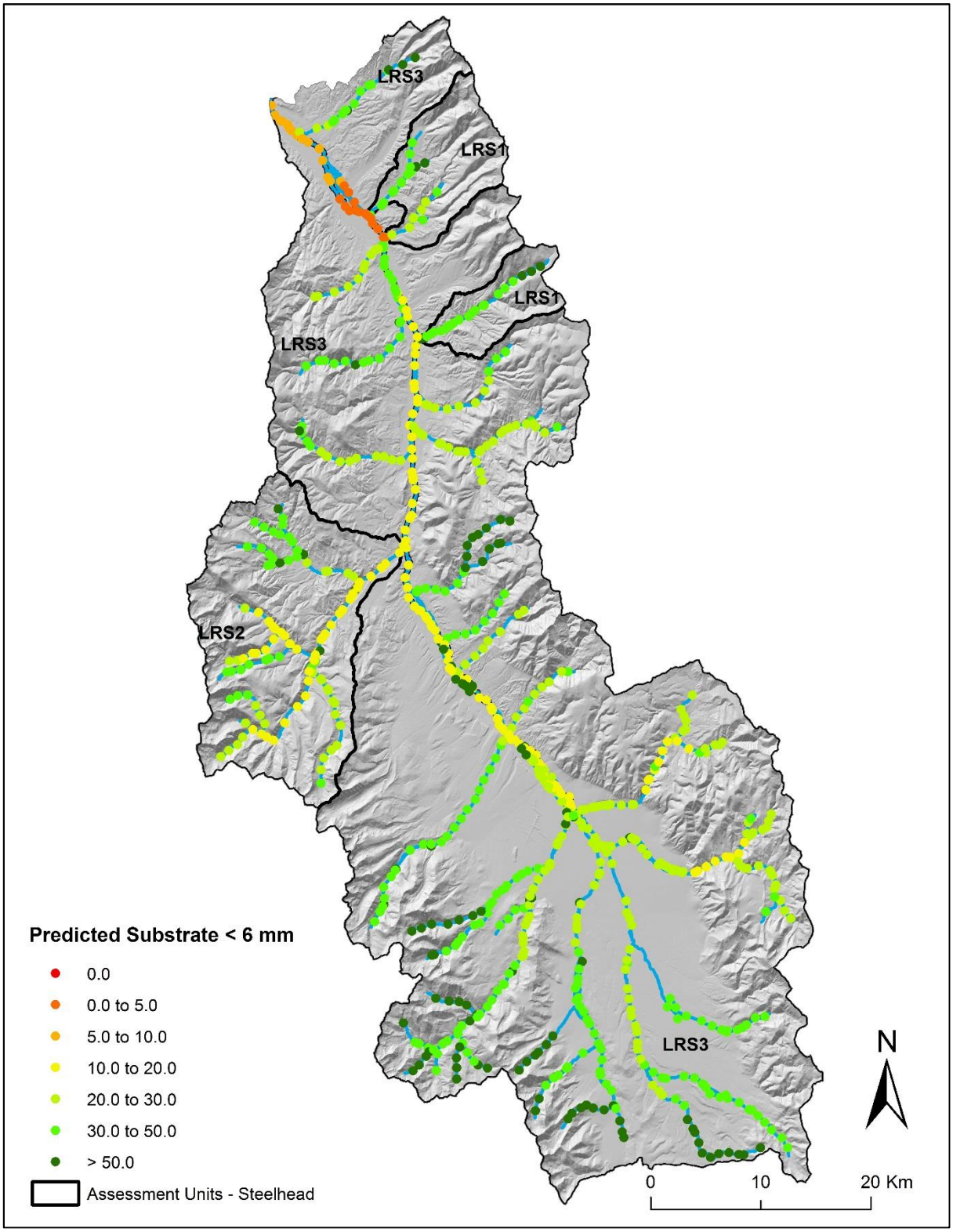


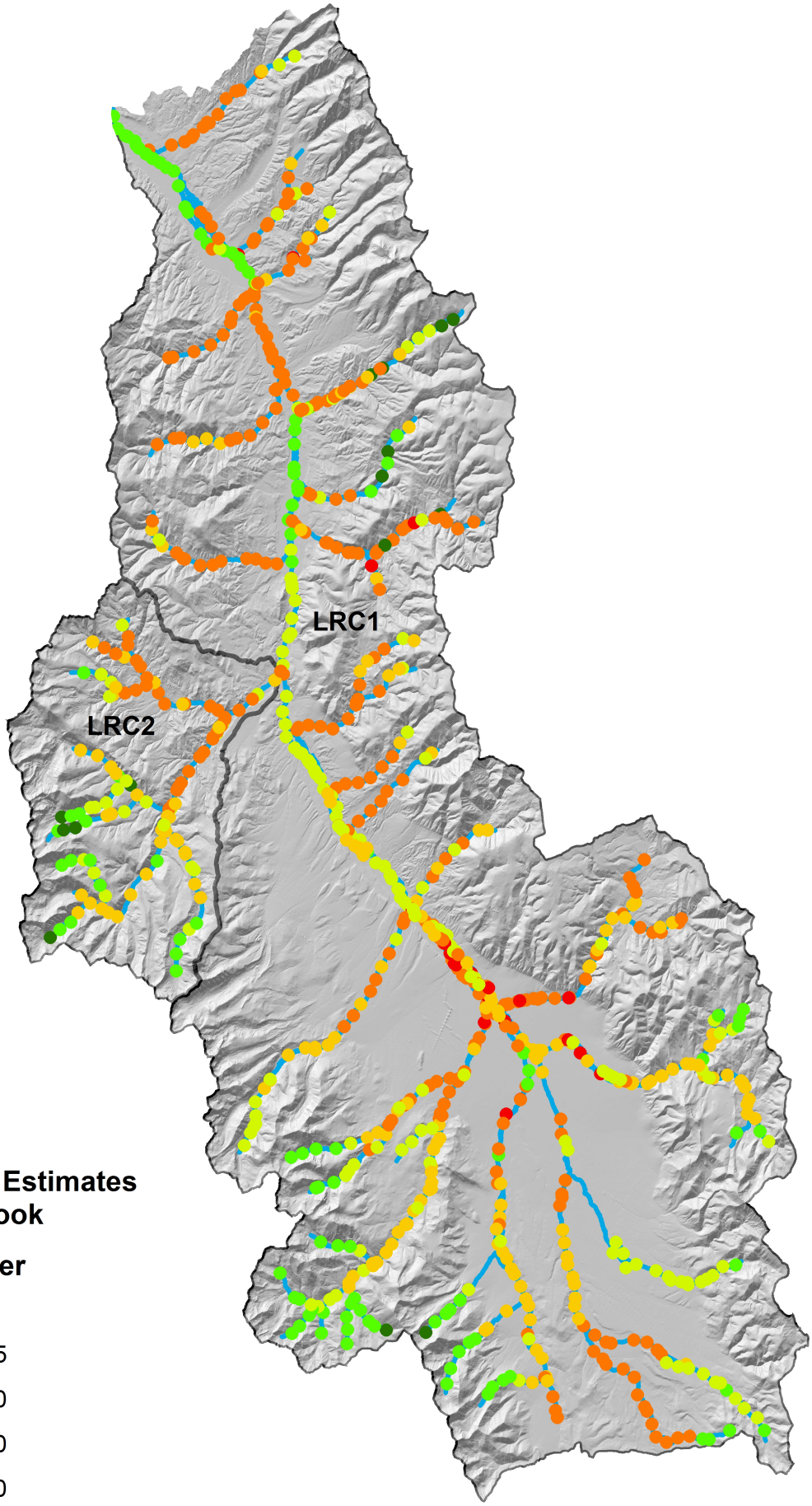


Sub Population	Visit Year	N	Mean	St Dev
	2011	26	14.012	12.918
	2012	41	27.035	24.977
	2013	35	37.167	28.663
	2014	22	23.094	13.519
	2015	21	26.399	15.951
All.Sites	Average of All Years	88	28.163	25.892
	2011	3	20.663	5.515
	2012	4	7.937	2.523
	2013	3	26.422	19.009
	2014	3	31.821	8.052
	2015	3	14.505	9.656
LRS1	Average of All Years	8	18.299	13.917
	2011	10	6.924	6.908
	2012	14	24.447	19.88
	2013	13	40.817	33.686
	2014	5	13.852	5.882
	2015	6	20.659	9.502
LRS2	Average of All Years	27	19.27	20.179
	2011	2	23.071	7.694
	2013	3	11.754	5.502
	2014	3	28.101	13.526
LRS3	Average of All Years	5	17.52	8.546

Substrate < 6 mm

- Source: CHaMP Metrics (www.champmonitoring.org)
- Definition: Average percentage of pool tail substrates comprised of fine sediment <6 mm





QRF Capacity Estimates
Juvenile Chinook

Fish per meter

- 0 to 1.0
- 1.0 to 1.5
- 1.5 to 2.0
- 2.0 to 3.0
- 3.0 to 5.0
- > 5.0

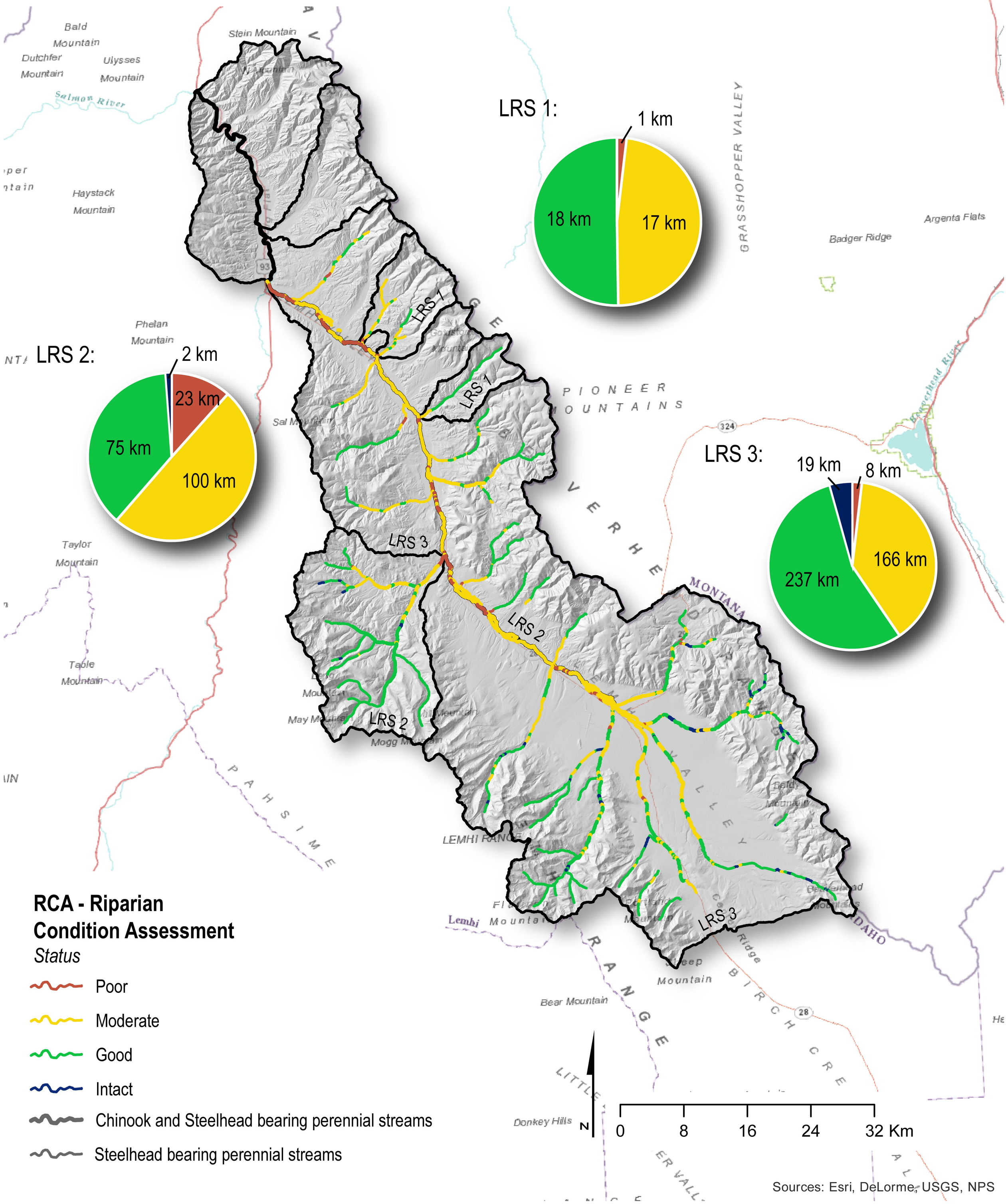
Assessment Units - Chinook

N

0 12.5 25 Km

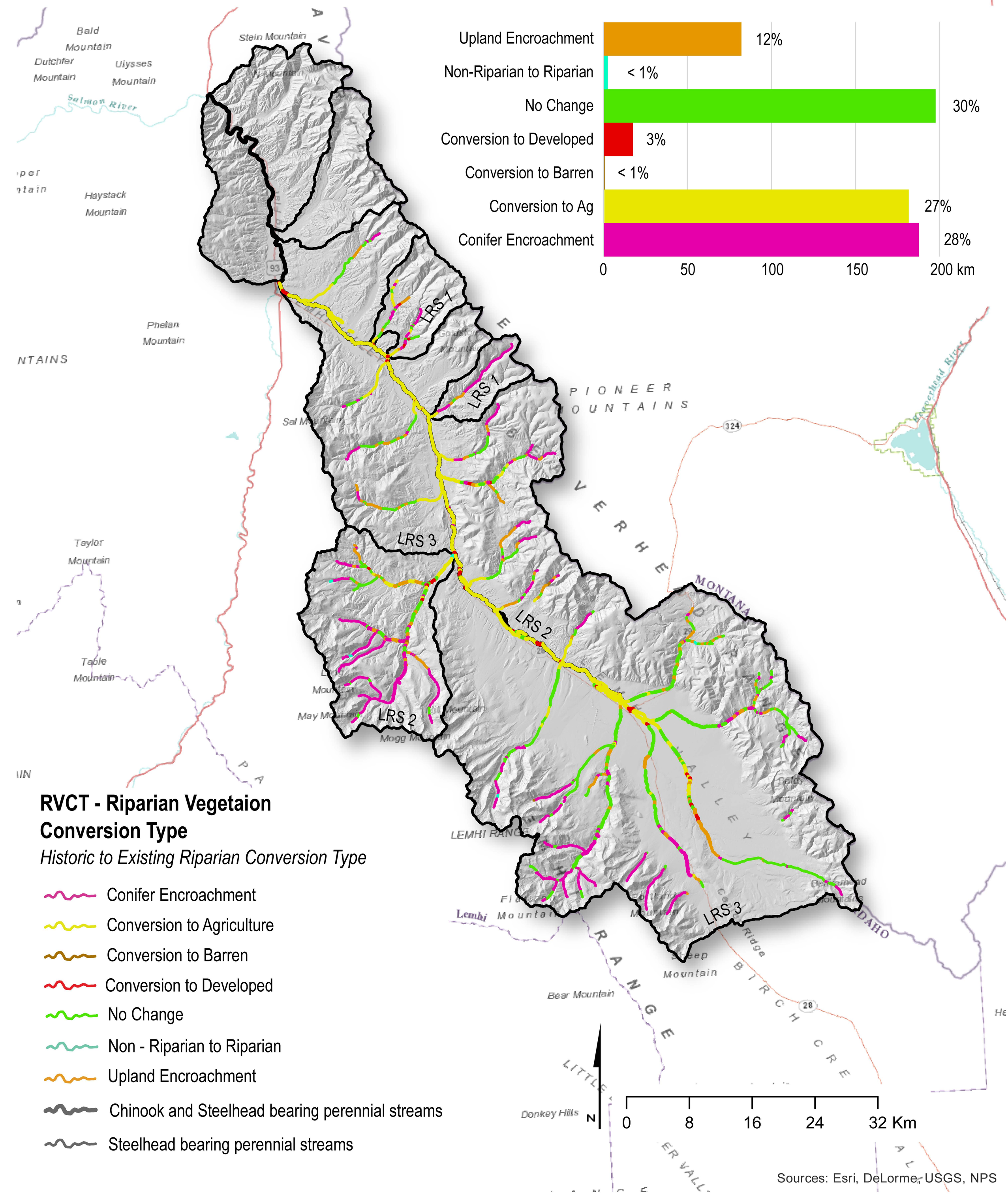
RIPARIAN CONDITION ASSESSMENT

Considering riparian departure, land use intensity & floodplain accessibility



RIPARIAN VEGETAION CONVERSION TYPE

Causes for departure from historic



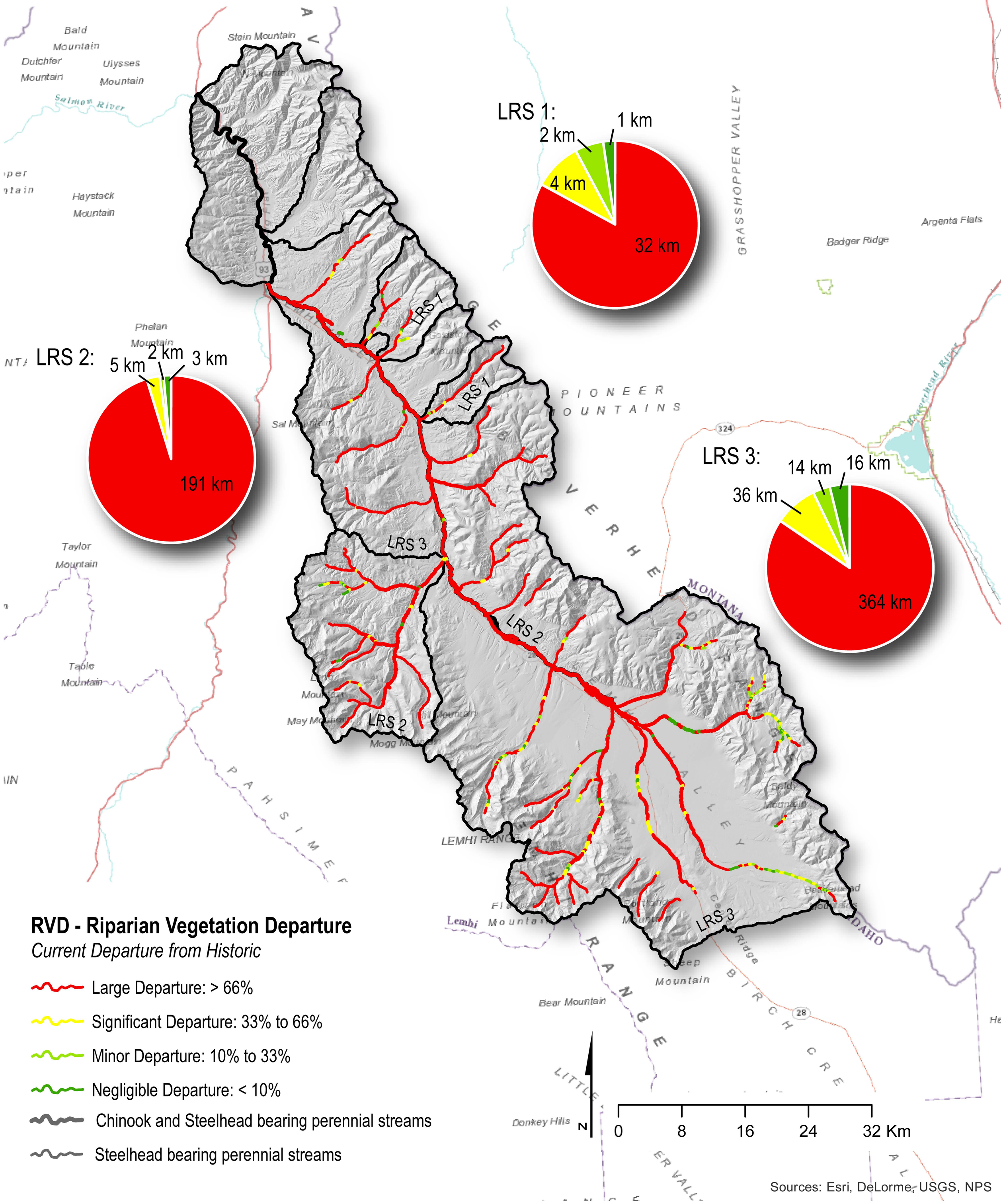
RVCT - Riparian Vegetaion Conversion Type

Historic to Existing Riparian Conversion Type

- Conifer Encroachment
- Conversion to Agriculture
- Conversion to Barren
- Conversion to Developed
- No Change
- Non - Riparian to Riparian
- Upland Encroachment
- Chinook and Steelhead bearing perennial streams
- Steelhead bearing perennial streams

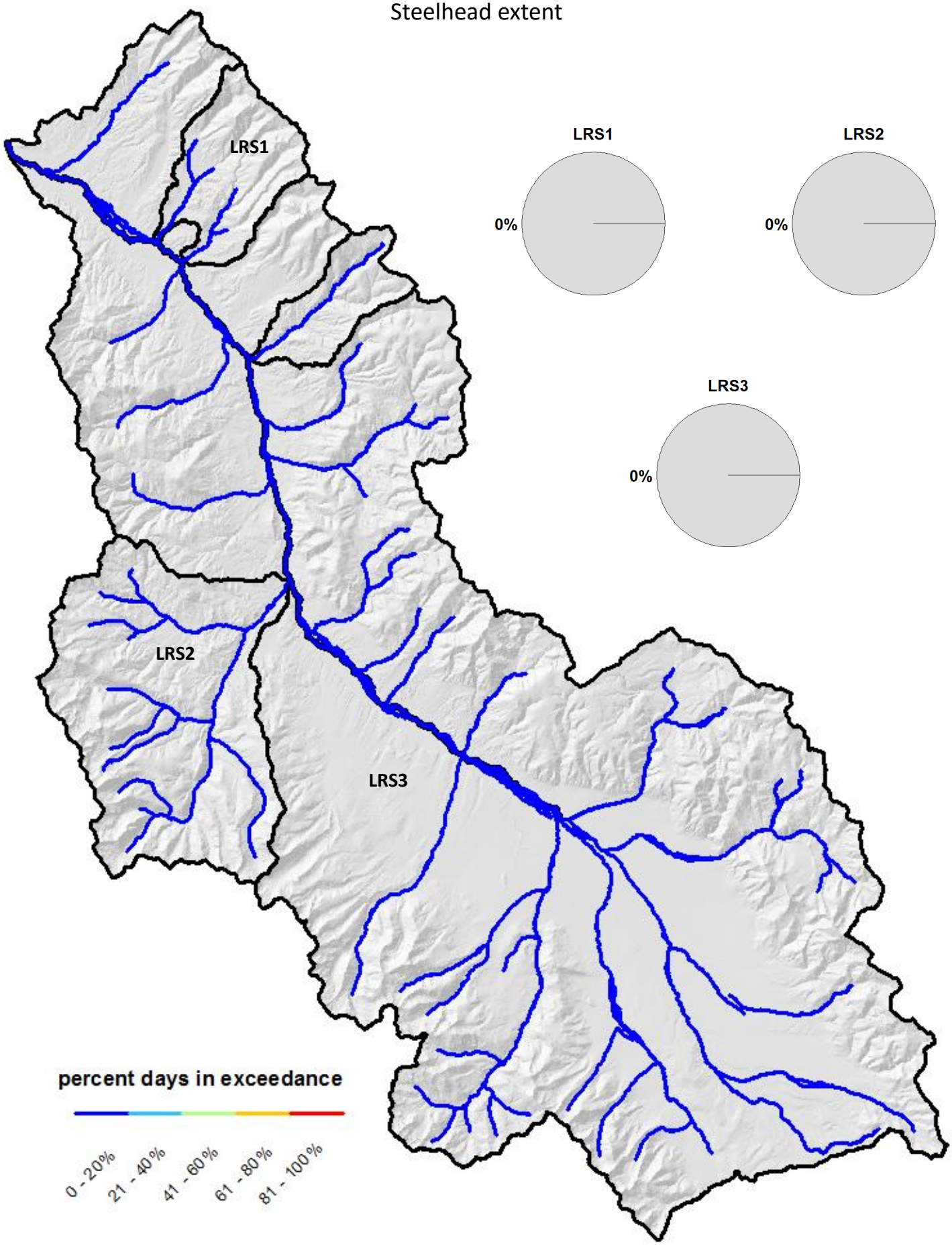
RIPARIAN VEGETATION DEPARTURE

Estimate of current departure from historic within valley bottom



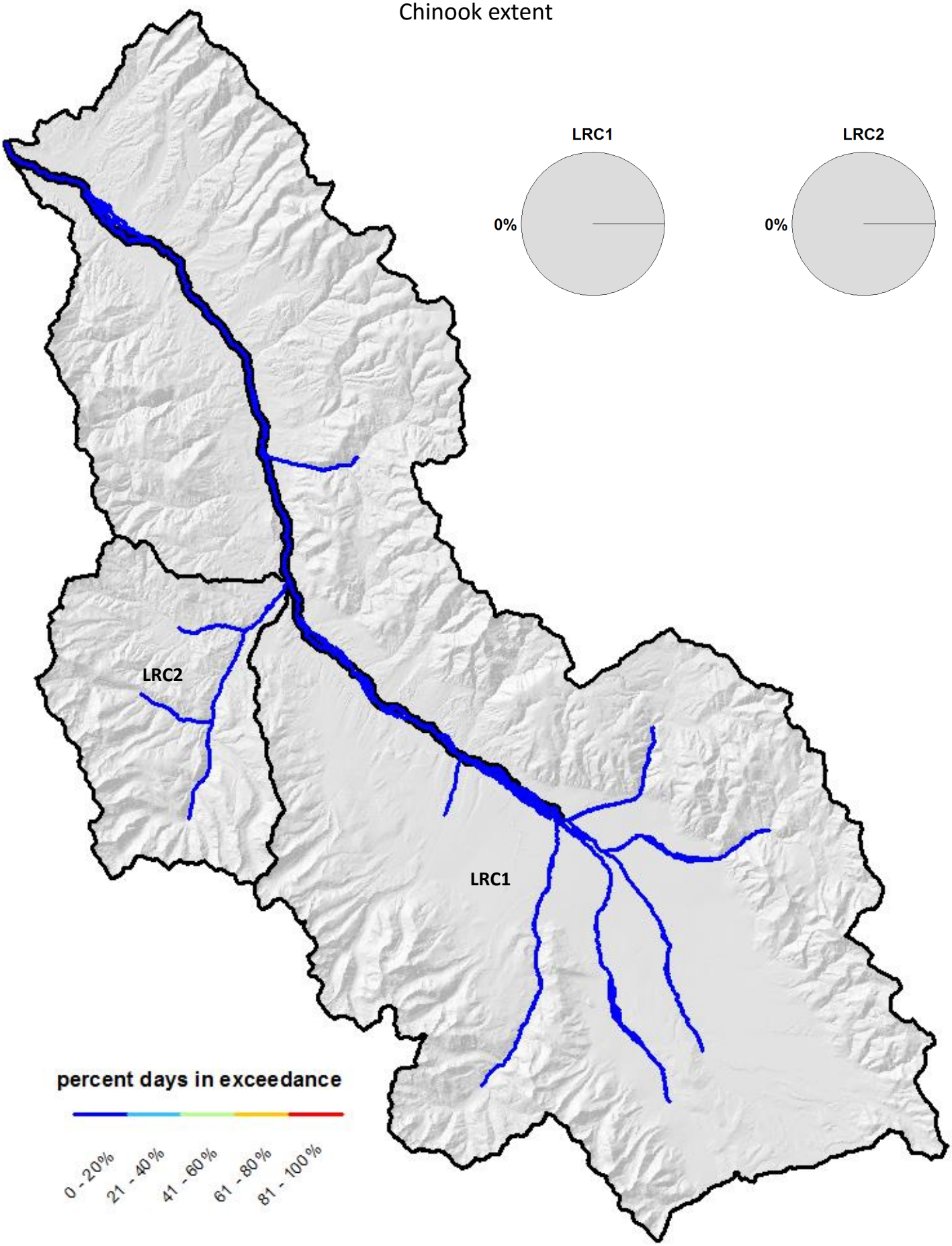
Lemhi River 2011

Percent summer days (20 July – 31 August) in exceedance of 18°C maximum stream temperature
Steelhead extent



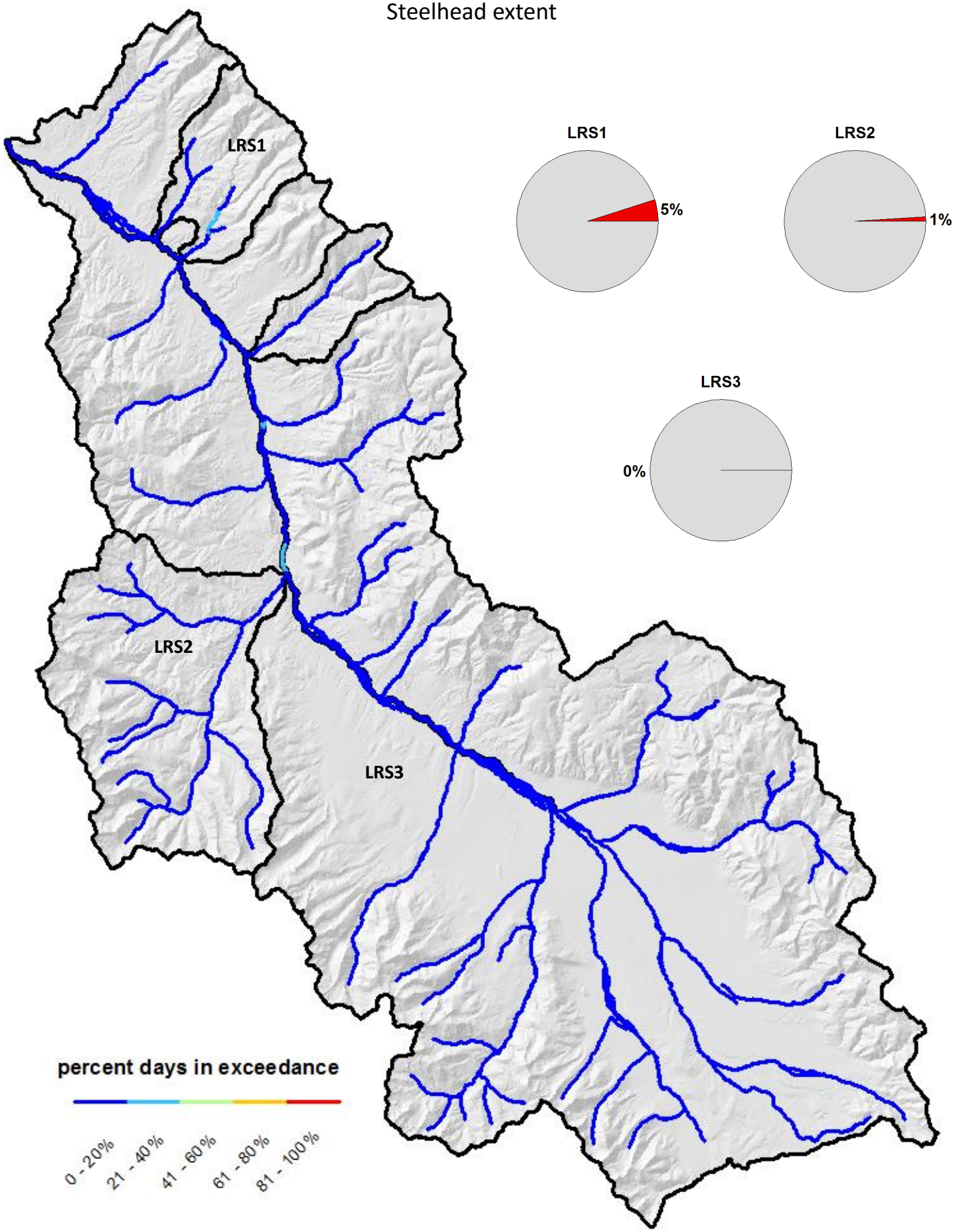
Lemhi River 2011

Percent summer days (20 July – 31 August) in exceedance of 18°C maximum stream temperature
Chinook extent



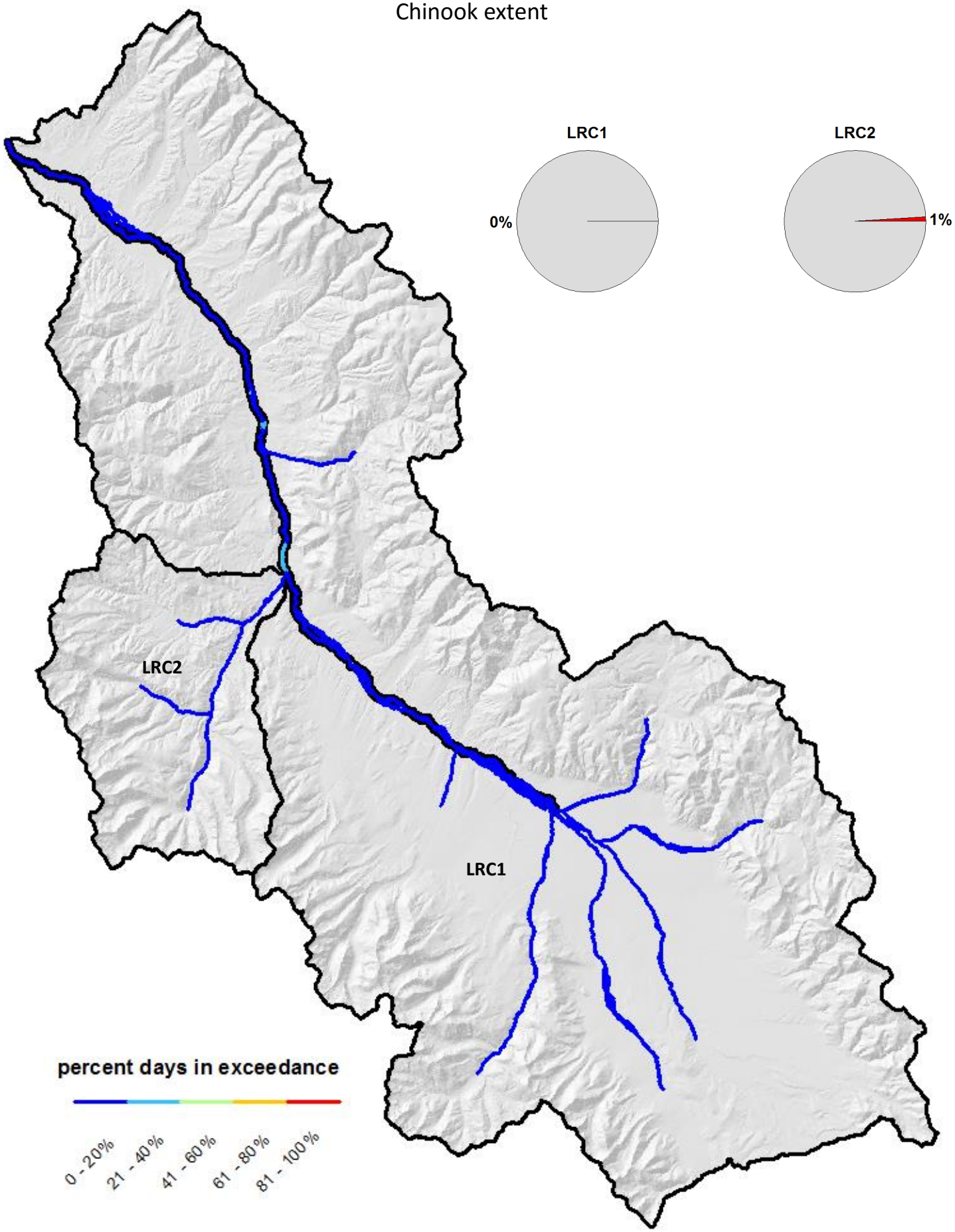
Lemhi River 2012

Percent summer days (20 July – 31 August) in exceedance of 18°C maximum stream temperature
Steelhead extent



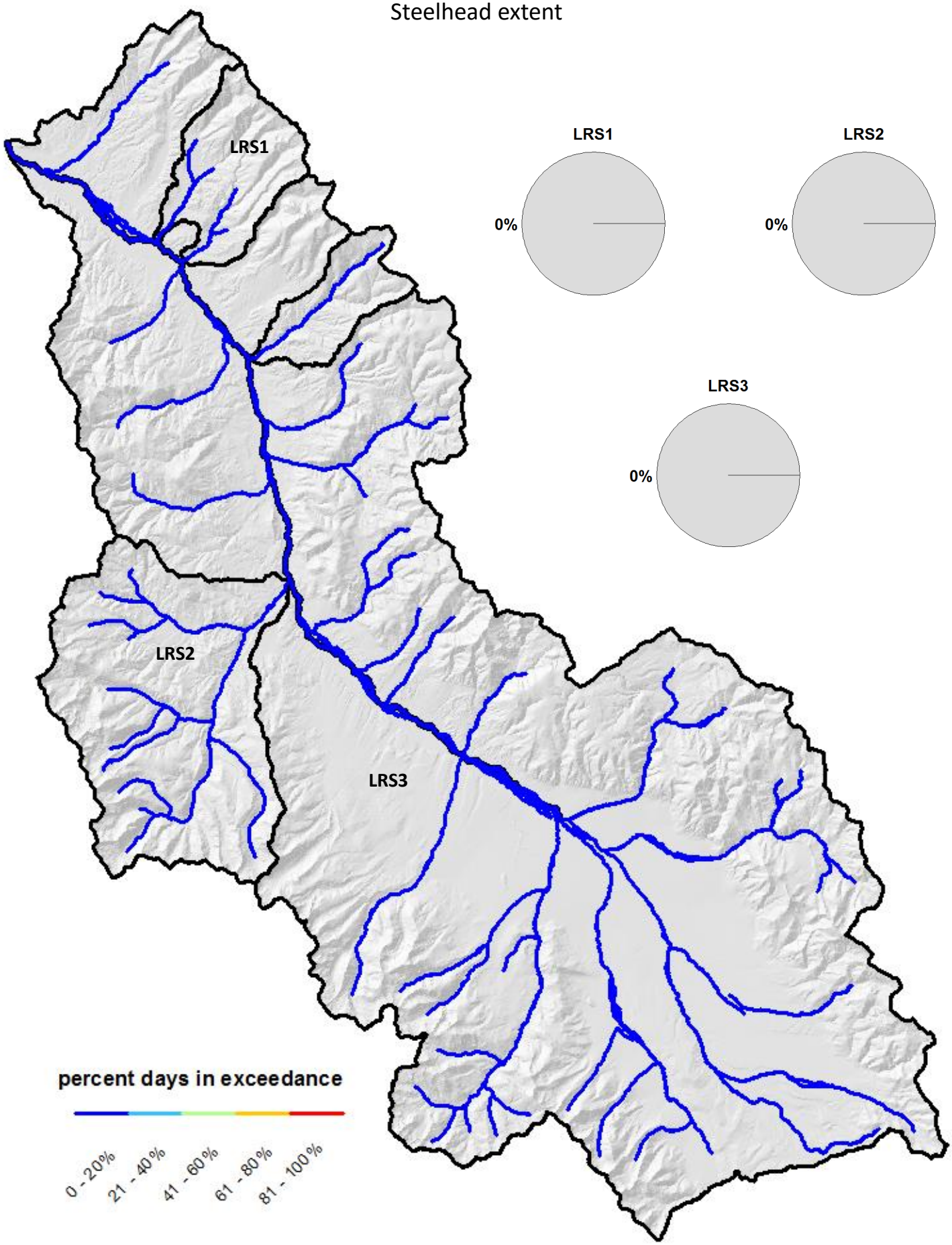
Lemhi River 2012

Percent summer days (20 July – 31 August) in exceedance of 18°C maximum stream temperature
Chinook extent



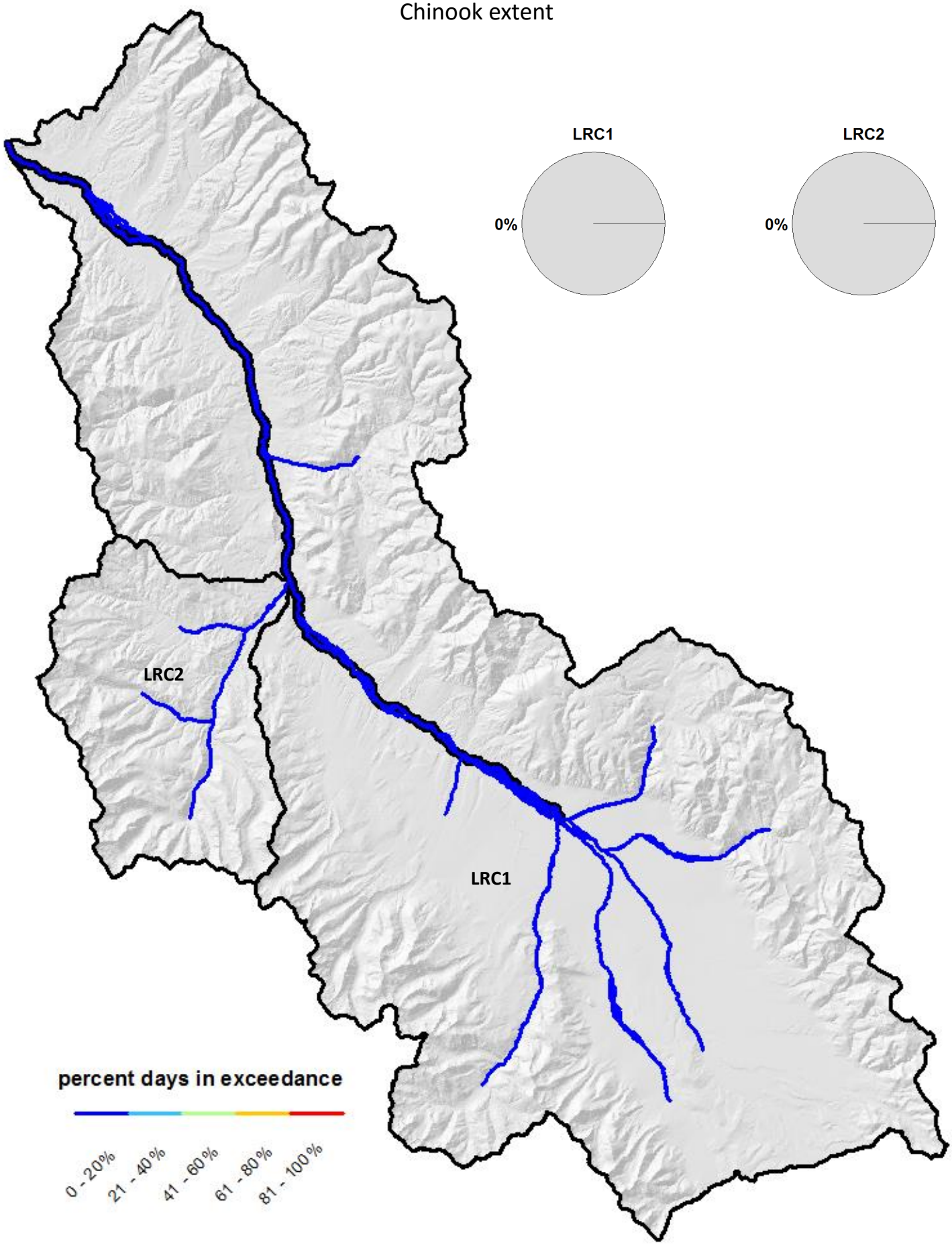
Lemhi River 2012

Percent summer days (20 July – 31 August) in exceedance of 20°C maximum stream temperature
Steelhead extent



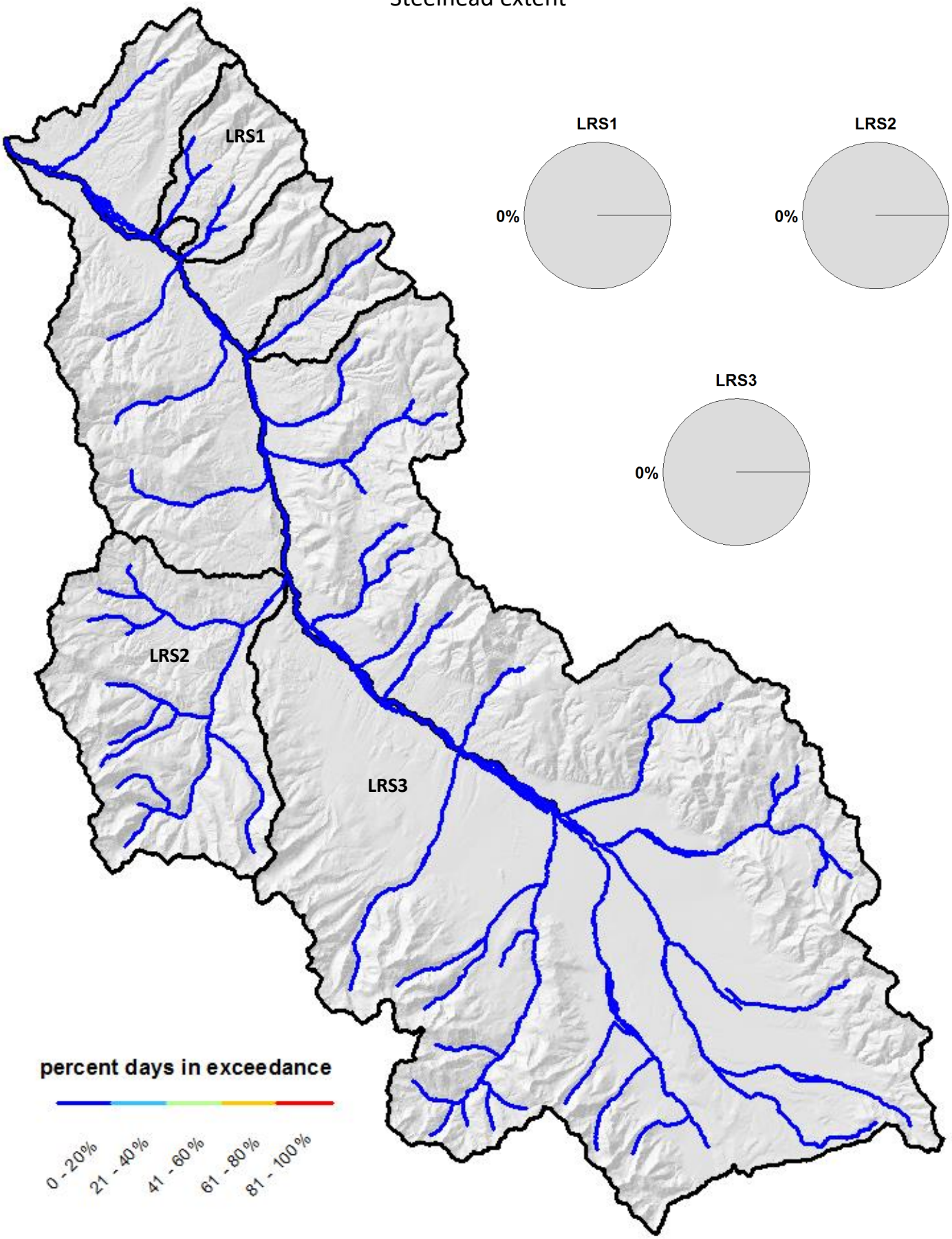
Lemhi River 2012

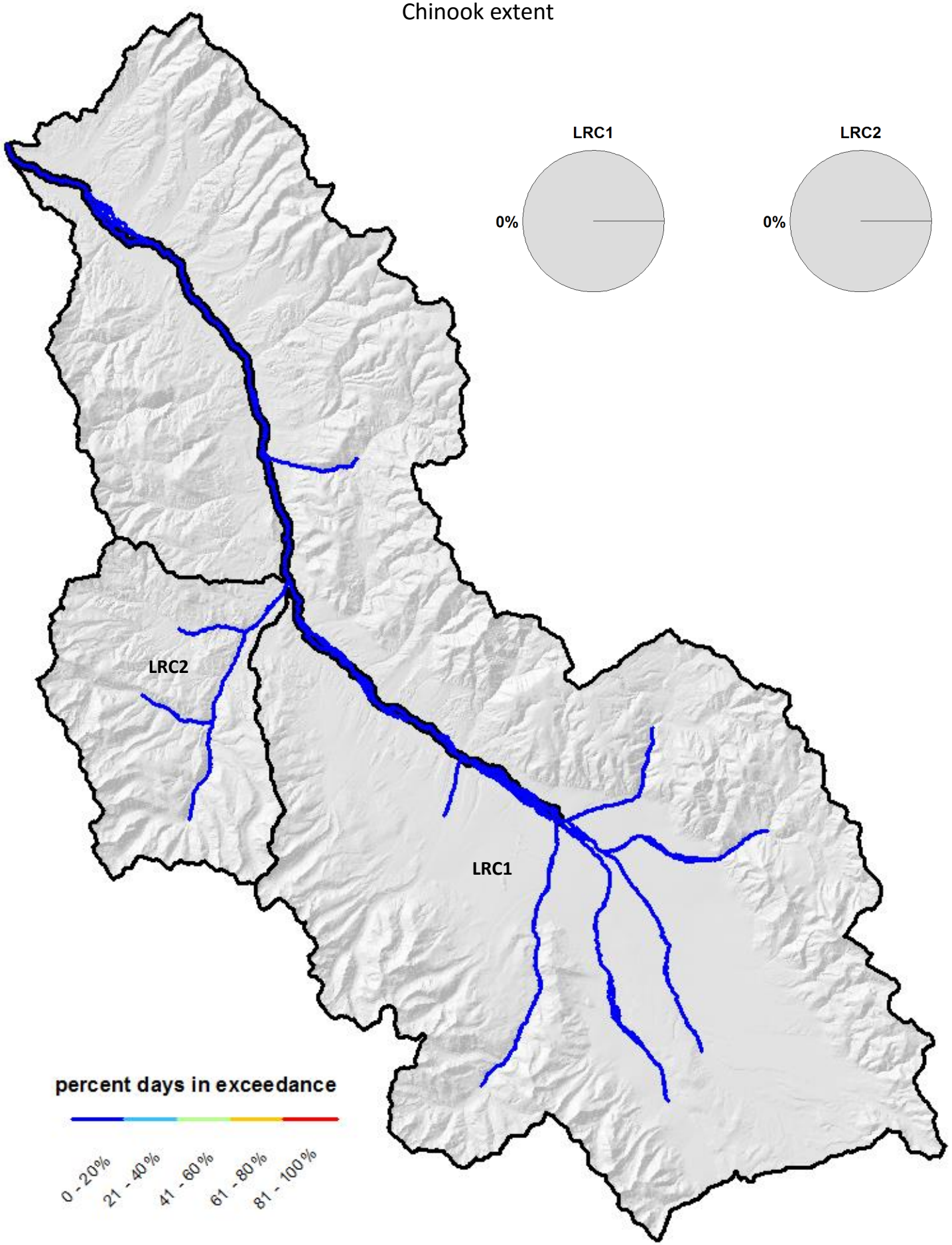
Percent summer days (20 July – 31 August) in exceedance of 20°C maximum stream temperature
Chinook extent



Lemhi River 2013

Percent summer days (20 July – 31 August) in exceedance of 18°C maximum stream temperature
Steelhead extent



Lemhi River 2013

Percent summer days (20 July – 31 August) in exceedance of 18°C maximum stream temperature
Chinook extent