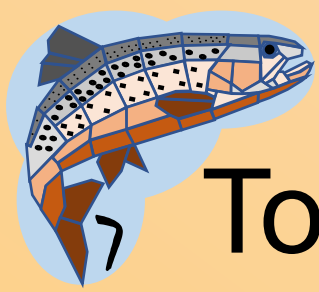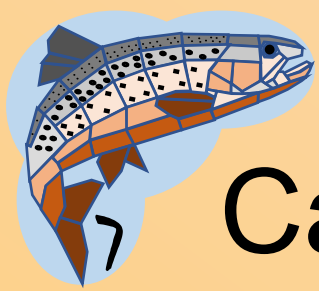# Calibration

Topics

- General points

- Calibration targets

- Model parameters typically used for calibration

- Approaches to calibration

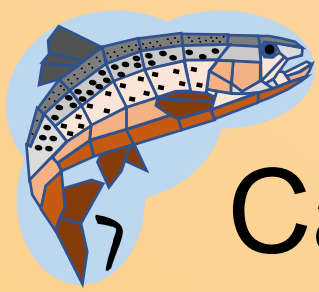- Additional calibration considerations

- Brief example

Calibration – general points

- First ask if calibration is necessary for your application

- The apparent complexity of calibrating complex IBMs?
  - Actually not an overwhelming challenge

- Purposes of calibration:
  - Improve model correspondence with observations
  - Estimate values of especially uncertain but important parameters.

- These purposes can usually be met via calibration of 2-4 parameters to make inSTREAM yield observed or plausible adult trout abundance and size.
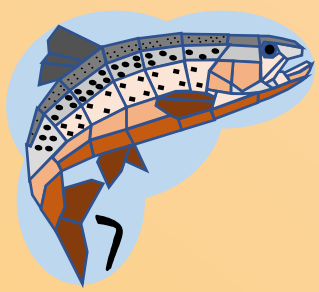
Calibration targets

- Typical targets include trout abundance and mean length, broken out by age classes (e.g., age 1 and age 2 and older) *usually a limitation*

- Your specific research questions may lead to additional worthwhile targets
  - Example: over-summer growth

- Constant v time series – for time series data, watch out for processes important to temporal variation not captured by the model
  - It may make sense to calibrate to means across years rather than annual data
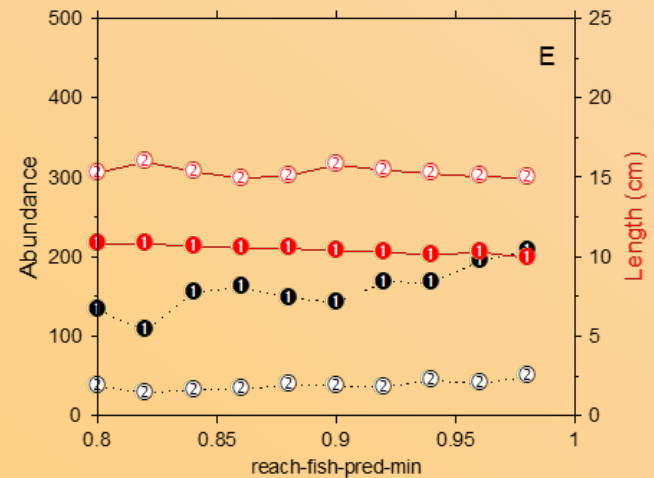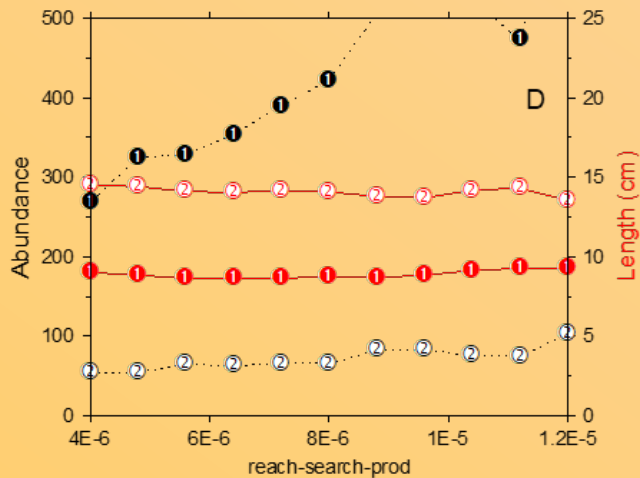
Calibration parameters

- Use uncertain parameters that strongly affect model results

- Typical calibration parameters: search food availability, drift concentration, baseline predation risk (terrestrial), baseline predation risk (aquatic)

Calibration parameters

Calibration approaches

- One-parameter at a time
  - But interactions among parameters should be expected

- Combinations (e.g. cross-classify 3 or 4 parameters)

- More sophisticated techniques
  - But don't let these pull you toward over-elaborate calibrations

Additional calibration considerations

- Initial conditions – burn in

- Replication

- Keep it coarse

Calibration – example results

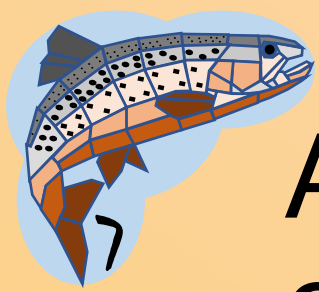|	A	B	C	D	E	F	G	H	I	J	K	L
1	**WWVR PreResto**			**TARGETS**	**176**	**37**	**23**	**6.6**	**11.2**	**15.5**	**0.030**	
2	**Search**	**Drift**	**TerrPred**	**AqPred**	**Overall Mean of FALL Age-0 abund**	**Overall Mean of FALL Age-1 abund**	**Overall Mean of FALL Age-2+ abund**	**Overall Mean of FALL Age-0 FL**	**Overall Mean of FALL Age-1 FL**	**Overall Mean of FALL Age-2+ FL**	**Overall Mean of summer instantaneous growth SPRING FL 95-135**	**MeanDif**
3	1.20E-05	4.3E-10	0.98	0.92	128	41	20	6.5	10.2	14.8	0.031	0.098
4	1.20E-05	4.3E-10	0.973	0.92	132	39	19	6.5	10.1	14.5	0.033	0.113
5	1.20E-05	4.3E-10	0.984	0.92	119	45	23	6.4	10.3	14.8	0.025	0.125
6	1.20E-05	6.45E-10	0.973	0.92	145	43	20	6.6	11.5	16.5	0.052	0.186
7	1.20E-05	6.45E-10	0.98	0.92	138	47	20	6.6	11.7	17.0	0.046	0.186
8	1.20E-05	2.15E-10	0.98	0.92	106	31	24	6.5	9.6	12.0	0.021	0.190
9	1.80E-05	2.15E-10	0.973	0.92	111	34	30	7.4	10.7	13.1	0.038	0.196
10	1.20E-05	6.45E-10	0.984	0.92	135	51	20	6.6	11.7	17.2	0.045	0.200
11	1.20E-05	2.15E-10	0.973	0.92	110	27	19	6.5	9.5	11.8	0.022	0.205
12	1.20E-05	2.15E-10	0.984	0.92	99	33	26	6.5	9.6	12.1	0.019	0.208
13	1.80E-05	2.15E-10	0.98	0.92	98	36	36	7.4	10.9	13.3	0.037	0.223
14	1.80E-05	4.3E-10	0.973	0.92	130	47	28	7.3	11.0	14.7	0.049	0.229
15	1.80E-05	2.15E-10	0.984	0.92	94	39	36	7.4	11.1	13.5	0.036	0.231
16	1.80E-05	6.45E-10	0.98	0.92	134	55	29	7.4	12.5	16.7	0.041	0.250
17	1.80E-05	6.45E-10	0.973	0.92	140	54	28	7.4	12.0	16.3	0.048	0.258
18	1.80E-05	4.3E-10	0.98	0.92	123	51	33	7.3	11.2	14.8	0.047	0.267
19	1.80E-05	4.3E-10	0.984	0.92	114	56	32	7.3	11.4	15.0	0.047	0.287
20	1.80E-05	6.45E-10	0.984	0.92	126	58	29	7.4	12.6	16.9	0.045	0.288
21	6.00E-06	4.3E-10	0.984	0.92	112	26	14	5.6	9.4	15.2	0.062	0.346
22	6.00E-06	2.15E-10	0.984	0.92	94	18	8	5.6	7.7	10.7	0.035	0.365