**Burns, J.W. (1971)**

* Juvenile coho, steelhead, and coastal cutthroat trout
* Northern California coast
* Focused on effects of logging on carrying capacity
* Biomass per unit surface area
* Assume enough spawners to reach carrying capacity
* Streams (sites) were 1 – 3 km

**Reeves, G.H. et al. (1989)**

* Coho
* Oregon & Washington coast
* Focus on identifying factors of physical habitat that may be limiting production
* Unclear what the biological basis is for fish-habitat relationships cited

**Nickelson et al. (1992) a**

* Juvenile coho
* Oregon coastal streams
* Fish density in different channel unit types (e.g. pools, riffles, glides)
* Sampled in spring, summer and winter
* Chose streams with “adequate” spawning escapement to fully seed rearing habitat, or filtered data to include streams with average density in pools of > 1 fish/m2
* Coho preferred pools (of varying kinds)

**Nickelson et al. (1992) b**

* Juvenile coho
* Oregon coastal streams
* Fish density in different channel unit types (e.g. pools, riffles, glides)
* Sampled in summer and winter
* Focused on effectiveness of constructed habitat types
* Fish densities in constructed pools were very similar to densities in natural pools

**Bradford et al. (1997)**

* Coho smolts
* Only stream length and latitude were useful in predicting smolt abundance

**Nickelson (1998)**

* Overwintering juvenile coho
* Oregon coastal streams
* Used habitat limiting factors model (HLFM v5.0)
  + Multiply amount of habitat type (channel unit types) by densities from Nickelson 1992

**Montgomery et al. (1999)**

* Spawning habitat
* Bed scour depths are constraining factor in salmonid distributions

**Eastwood et al. (2001)**

* Sole (bottom fish)
* English channel and southern North Sea
* Linear quantile regression to examine effect of habitat on upper quantiles of observed sole density

**Olden & Jackson (2001)**

* Lakes in Ontario
* Artificial neural network (ANN) models with various habitat covariates
* Occupancy of 9 fish species
* Abundance of 4 fish species
* ANNs outperformed logistic regression for occupancy and linear regression for abundance with simulated data

**Sharma & Hilborn (2001)**

* Coho smolts and smolts / spawner
* Western WA streams
* Habitat factors include stream level (pool area, pond area, woody debris, stream length, gradient), watershed level (drainage area, valley slope) and land-use variables (road density)
* Best fish-habitat relationship: smolt density correlated with pool density (*r2* = 0.85), pond density and LWD

**Dunham et al. (2002)**

* Cutthroat trout vs. width, depth and width:depth ratio
* Linear and non-linear (log link) quantile regression
* Upper quantiles showed negative relationship between trout density and width:depth ratio
* Evidence for different intercept between streams with non-native brook trout and those without, but little evidence for different slopes in the width:depth coefficient

**Pess et al. (2002)**

* Adult Coho
* Snohomish River, WA
* Forested areas had higher fish densities than urban or agricultural areas

**Eastwood et al. (2003)**

* Sole (bottom fish)
* English channel and southern North Sea
* Linear quantile regression to examine effect of habitat on upper quantiles of observed sole density
* Extrapolated with GIS of habitat data to show extent of species’ range and habitat suitability

**Rosenfeld (2003)**

* Freshwater stream fish species
* Review the approaches that have described habitat requirements
* Differentiates between habitat selection (where fish are found in the wild), habitat preference (best determined with habitat choice experiments) and habitat requirement (effect on survival / fitness of losing types of habitat).
* Presence / absence models
* Capacity models
* Microhabitat models
* Bioenergetic models
* How to scale habitat requirements up to larger spatial scales

**May & Lee (2004)**

* Juvenile salmonids (coho, steelhead) and cutthroat trout
* Coastal OR streams
* Mid and late summer fish surveys
* Fish abundance in pools dropped from mid to late summer, particularly in gravel bed pools (these often dried up)
* Bedrock reaches had more continuous flow than gravel-bed reaches

**Mossop & Bradford (2006)**

* Juvenile Chinook
* Yukon river
* Correlated metrics derived from thalweg profiles with fish densities
* Found positive relationship between log of fish density and: residual pool length, mean maximum residual pool depth, log LWD abundance, variability of residual pool lengths, and a negative relationship between fish density and gradient.

**Torgersen et al. (2006)**

* Juvenile Chinook, steelhead, adult bull trout and mountain whitefish (coldwater fish)
* Northern pikeminnow, redside shiner, speckled dace, largescale sucker and bridgelip sucker (cool-water fish)
* Snorkel surveys over large stretches of 3 rivers in OR (Middle Fork John Day, North Fork John Day, Wenaha)
* Nonmetric multidimensional scaling (NMDS) of several habitat variables to examine their association with fish
* Chinook and steelhead associated with NMDS axis consisting of stream gradient and temperature
* Results not consistent across rivers

**Roni et al. (2008)**

* Review of effectiveness of stream habitat restoration

**Valavanis et al. (2008)**

* Fish habitat modeling for marine fish
* Focused on species distributions

**Vaz et al. (2008)**

* Marine fish in English Channel
* Species distributions
* Used regression quantiles (75th to 95th) with up to 2nd order polynomial effects

**Bryant & Woodsmith (2009)**

* Juvenile Coho, steelhead cutthroat trout
* Southeast Alaska streams
* Linear regression between fish density and habitat metrics
* Habitat unit scale
  + Coho fry negatively related to pool area (More fish in smaller pools)
* Reach scale
  + Coho parr negatively related to pools per m
  + Coho parr positively related to LWD
  + Steelhead had opposite relationships (+ pools/m, - LWD)
  + Low *R2* for all relationships

**Pittman et al. (2009)**

* Coral reef fishes
* Boosted regression trees to predict species abundance, richness and distribution based on habitat metrics

**Knuby et al. (2010)**

* Coral reef fishes
* Species biomass and diversity
* Compared several techniques, including linear models, GAMs, support vector machine, bagging, random forests and boosting
* Random forest models performed best (most impervious to changes in dataset, best predictive performance)
* Importance of non-linear fish-habitat relationships and of models that can solicit them

**Sweka & Mackey (2010)**

* Atlantic salmon parr
* Quantile regression
* Parr density was negatively correlated with cumulative drainage area
* Postulated that the 90th quantile was a proxy for carrying capacity

**Braun & Reynolds (2011)**

* Adult sockeye salmon
* Fraser River, BC
* Percent pools, percent undercut, LWD all positively associated with spawner density

**Pittman & Brown (2011)**

* 5 common Carribean reef fish species
* Predict species distribution based on seascape topology and across-shelf location
* Used boosted regression trees (BRT) and MaxEnt.
* Presence-only data
* Good predictions, MaxEnt had excellent accuracy

**Ayllon et al. (2012)**

* Brown trout (salmonid species) in Mediterranean streams
* Available habitat / territory size = carrying capacity for given lifestage

**Anlauf-Dunn et al. (2014)**

* Adult coho
* Oregon coast
* Occupancy & abundance – related to habitat factors
* 1 km reaches
* Delta GLMM
  + binomial and log-normal models
  + Site and year random effects

**Gallagher, S.P. et al. (2014)**