Bearded seal modeling notes (real data)

\*currently setting proportion land = 0 and not controlling for that. Will want to change eventually

\*severe (presumable) negative bias. Is this because of the way the objective function is structured on the log of abundance?

- Added I\_zero: N-hat = 285K

- Changed variance low to values to be higher; N-hat = 285K

\*why do northing terms march off to negative land? Maybe because no seals in open water in the south? Could put in an I\_zero binary variable? Or “south of ice edge? Or interaction b/w ice and northing? Guessing it has something to do with that! Could also put in splines…

\*All the high z-scores are associated with Russian “strata” boundaries!!!

\*It may be worth converting cell-specific absolute abundances to relative abundances and treating them similar to the UD likelihood; then, N-hat ~ N(sum(Z\_st},sigma^2) over reduced parameter space

\*Tuned on splines (with current count model for aerial surveys). Does not converge and shows nonsensically high estimates in SE corner (prob trying to explain high values in Karginsky Bay). Maybe think about changing to SPDE model for spatial effect? (increasing df for easting, northing from 5 to 6 helps things a little but now there’s extrapolations on northern boundary)

\*SPDE framework in current aerial survey count setup. Converges! Produces reasonable estimates! Though – looks like it keys in on aerial survey estimates a lot more than anything else. Note that ice covariate relationship doesn’t look right (strictly decreasing), except negative effect for “no ice” (<0.01). Probably need better ice covariates… e..g, distance south from southern ice edge (or extend “no ice” covariate to be “within x distance of ice” to get rid of kernel smoothing we did of aerial survey estimates… maybe also a 100% ice effect, spline for ice…

\*Decoupling N and Pi in aerial survey data seems to be working (using sim data)! Using a wLS objective function for aerial survey relative abundance, and a lognormal for aerial survey N. Bias on total abundance not sig diff from zero.

\*Will want to look at getting a better # for SE(N) of total abundance….currently way too low for aerial survey data (doesn’t factor in covariances…). DONE – just used estimates from papers.

\*There seems to be some additional model fitting problems with doing a wLS objective function on standardized Pi values in aerial survey data. The spline models often don’t converge, and trying to do an SPDE fails w memory, presumably because standardizing Pi for a limited area (e.g., Bering, Chukchi) destroys sparsity since you’re dividing by a sum…