Process for sorting through Nisqually salmon data from Craig

Data from three fisheries provided: Green River Chinook, LocNis Chinook, and Winter Chum

**LocNis**

LocNis data is arrival at RM 13, which Craig estimates is 1 week above the gauntlet. I’m interpreting the weekly % as the proportion of the run that is at RM 13 in that week (total present, not number arriving). I’m assuming that all days within that management week are identical and have the same abundance as the overall weekly proportion. He estimates early to mid-July is a good starting point for when they enter the gauntlet, though the data currently doesn’t start until management week 32 (august 6th) because that’s when they started fishing. I’m adding 1% weekly for management weeks 30 and 31 which brings it back to July 23rd at RM 13 as a conservative guess for what was happening before fishing opened. RM 13 is 1 week above the gauntlet so I shifted the whole distribution 1 week earlier to cover their travel time from the gauntlet. So, the daily # in the Gauntlet is:

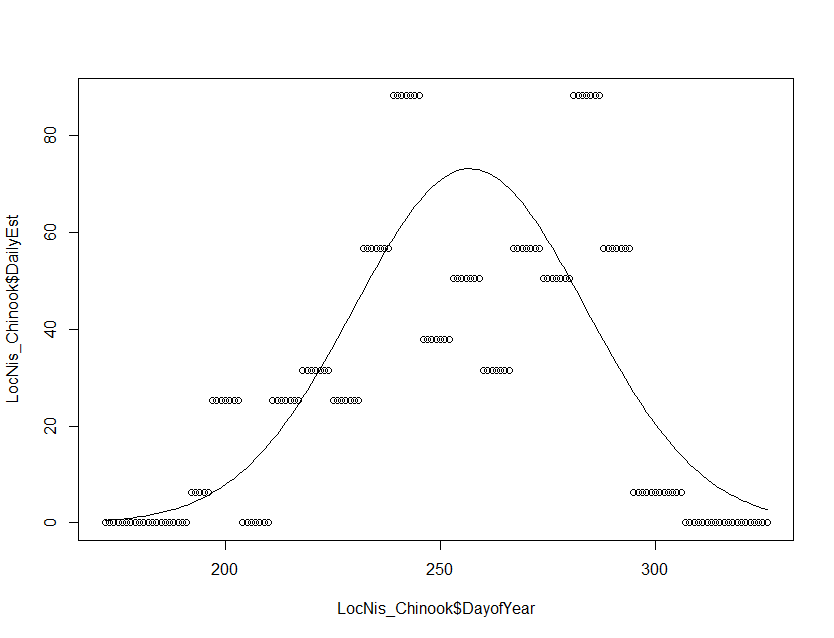
# on day t-7 = (week % \* average run size)

So now the fish are estimated to be in the Gauntlet from management week 29 to 45, roughly July 16th – Nov 5th. (highlighted cells are ones I messed with or made up)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| wk | ish | RM 13 | Gauntlet | Est (\* 630) |
| 29 | 16-Jul |  | 1% | 6.3 |
| 30 | 23-Jul | 1% | 1% | 6.3 |
| 31 | 30-Jul | 1% | 4% | 24.23077 |
| 32 | 6-Aug | 4% | 0% | 0 |
| 33 | 13-Aug | 0% | 4% | 24.23077 |
| 34 | 20-Aug | 4% | 5% | 32.30769 |
| 35 | 27-Aug | 5% | 4% | 24.23077 |
| 36 | 3-Sep | 4% | 9% | 56.53846 |
| 37 | 10-Sep | 9% | 14% | 88.84615 |
| 38 | 17-Sep | 14% | 6% | 40.38462 |
| 39 | 24-Sep | 6% | 8% | 48.46154 |
| 40 | 1-Oct | 8% | 5% | 32.30769 |
| 41 | 8-Oct | 5% | 9% | 56.53846 |
| 42 | 15-Oct | 9% | 8% | 48.46154 |
| 43 | 22-Oct | 8% | 14% | 88.84615 |
| 44 | 29-Oct | 14% | 9% | 56.53846 |
| 45 | 5-Nov | 9% | 1% | 8.076923 |
| 46 | 12-Nov | 1% |  | 0 |

He also estimates that they likely spent less time in the gauntlet than GR because they’re brighter. Since he estimates 1-3 weeks for GR, I think maybe 1 week is a good starting point.

This arrival data is not a nice normal distribution. Right skewed, and highly irregular. I’ll start with a poorly fitting normal, but flagging that this could use refinement. Maybe a skewed beta eventually?



Mostly seal predation, gauntlet is delta and estuary.

Residence time: 1 week

Enter Gauntlet: early to mid-July (16th)

Leave Gauntlet: early November (5th)

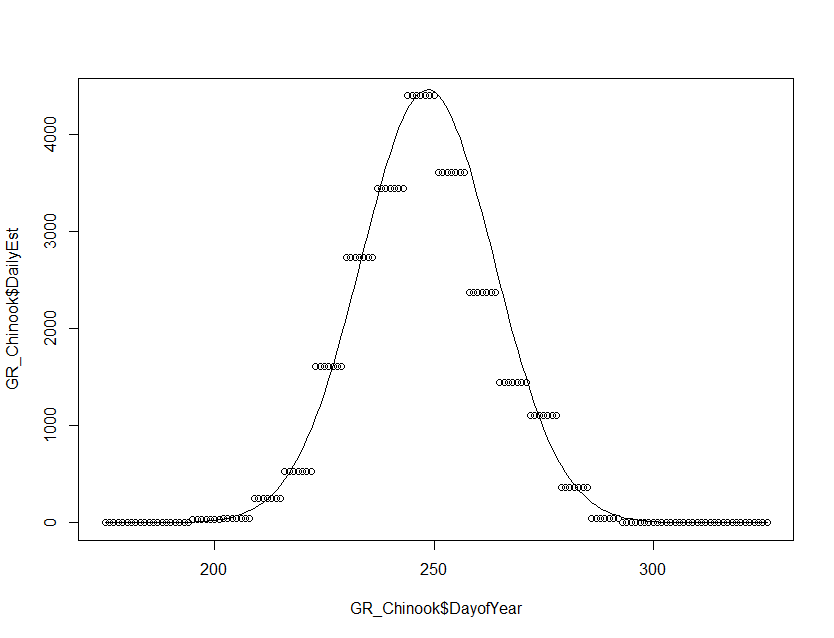
Run size: 300-1400, average 630

**Green River**

Craig provided timing curve expressed as % timing through gauntlet, which I’m interpreting as % of run in residence at the gauntlet during that week.

|  |  |  |  |
| --- | --- | --- | --- |
| wk | ish | % timing through gauntlet | Est (\*22k) |
| 29 | 13-Jul | 0.16% | 35.18451 |
| 30 | 20-Jul | 0.19% | 41.90667 |
| 31 | 27-Jul | 1.15% | 252.7802 |
| 32 | 3-Aug | 2.42% | 533.1833 |
| 33 | 10-Aug | 7.31% | 1607.925 |
| 34 | 17-Aug | 12.40% | 2727.358 |
| 35 | 24-Aug | 15.65% | 3442.176 |
| 36 | 31-Aug | 19.99% | 4397.362 |
| 37 | 7-Sep | 16.39% | 3605.773 |
| 38 | 14-Sep | 10.79% | 2374.228 |
| 39 | 21-Sep | 6.56% | 1443.645 |
| 40 | 28-Sep | 5.05% | 1111.918 |
| 41 | 5-Oct | 1.67% | 366.8311 |
| 42 | 12-Oct | 0.21% | 47.13183 |
| 43 | 19-Oct | 0.04% | 8.416399 |
| 44 | 26-Oct | 0.02% | 4.180805 |

Looks like a nice normal distribution, should be easy to replicate.



He estimates 1-3 weeks in gauntlet based on fish brightness and condition.

Mostly seal predation, gauntlet is delta and estuary.

Residence time: 1-3 weeks

Enter Gauntlet: July 13th

Leave Gauntlet: October 31st

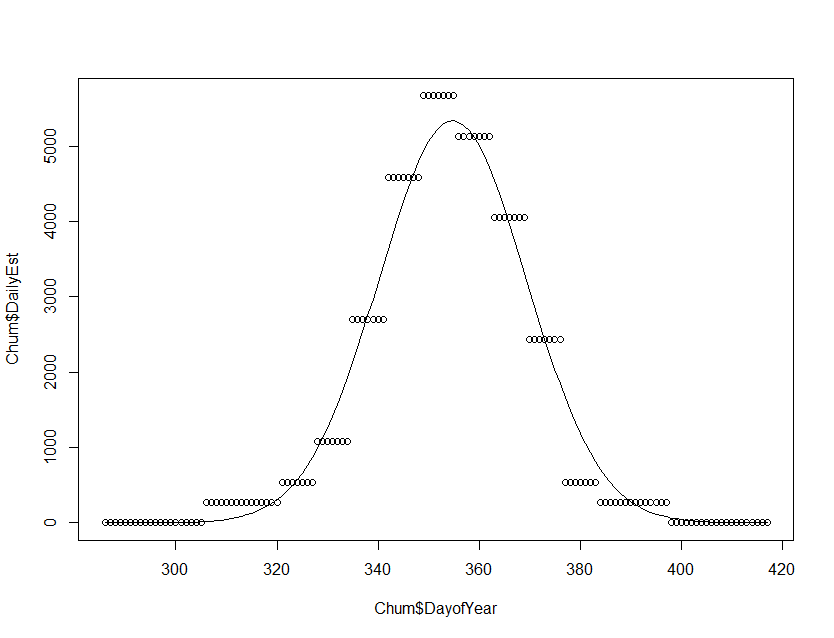
Run size: 6,000-42,000, average 22,000

**Winter Chum**

Here Craig provides % of run in the gauntlet weekly.

|  |  |  |  |
| --- | --- | --- | --- |
| man. wk | ish | chum timing guantlet based on recent catch data | est (\* 27k) |
| 47 | 16-Nov | 2% | 540 |
| 48 | 23-Nov | 4% | 1080 |
| 49 | 30-Nov | 10% | 2700 |
| 50 | 7-Dec | 17% | 4590 |
| 51 | 14-Dec | 21% | 5670 |
| 52 | 21-Dec | 19% | 5130 |
| 53 | 28-Dec | 15% | 4050 |
| 54 | 4-Jan | 9% | 2430 |
| 55 | 11-Jan | 2% | 540 |
| 56 | 18-Jan | 1% | 270 |

For Chum we’re defining the gauntlet as the whole area from the river mouth through wherever the fish spawns, and the “escape” rate is actually successful spawning. Need to think about what this means for estimating the time fish spend from entering the gauntlet to spawn.



Residence time: ?

Enter Gauntlet: November 1

Leave Gauntlet: January 31

Run size: 2,000-62,000, average 27,000