**Supplementary Material**

Table S1. Stages of oocyte and embryonic development for female Harlequin Rockfish *Sebastes variegatus* (from Shaw et al. 2012). Phases correspond to Brown-Peterson et al. (2011) standardized terminology.

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| --- | --- | --- | --- | --- |
| Status |  | Phase |  | Main Histological Description |
|  |  |  |  |  |
| Immature |  | Immature |  | Primary growth oocytes: early and late perinuclear stages; oil vacuole (OV) also present. No evidence of previous spawning, abortive maturation or non-reproductive state; tissue well-organized; minor to no atresia; thin ovarian wall (OW). |
|  |  |  |  |  |
| Mature |  | Developing |  | Primary vitellogenesis (Vtg1 and Vtg2); small yolk globules or drops begin to form along the periphery of oocytes, with a stronger globule presence as oocytes enlarge; some atresia present. Some tissue disorganization from a previous spawning present. |
|  |  |  |  |  |
| Mature |  | Spawning-Capable (spawning/  parturition) |  | Tertiary vitellogenesis (Vtg3); yolk globules cover majority of oocyte cytoplasm, nucleus well defined; some oocytes exhibiting nucleus migration (MN); includes oocyte maturation and initiation of fertilization. No evidence of recent spawning. After fertilization, embryonic stages (zygote through hatching periods), including eyed-larvae are present. Post-ovulatory follicles (POFs) may be present. |
|  |  |  |  |  |
| Mature |  | Regressing |  | POFs may be present. Ovary wall thick. Presence of early and late-stage atresia (AL). Residual embryonic stages. Disorganized lamellae structure. Muscle bundling prominent. Blood vessels present. |
| Mature |  | Regenerating |  | Primary growth oocytes. Vtg1 oocytes present later in this stage. Late-stage atresia common, but resorption near completion. Lamellae organization appears to be initiated. Muscle bundling prominent. Blood vessels present. |

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Figure S1. A scatterplot with marginal histograms showing the length at age for those Harlequin Rockfish females collected in the Aleutian Islands (AI) to investigate aspects of reproduction.

The histograms represent the distribution of the scatter data for each variable. Points are

slightly jittered to avoid overplotting a discrete position.





Figure S2. Average bottom temperature and ocean productivity (ocean color = g·C·m-2·day-1 ± SD) within the five Gulf of Alaska (GOA) areas during 1993-2013.