**What changed across models**

* **Model structures**
  + **Two-area (ALL)**: Area 1 = **EBS/NBS+WGOA**, Area 2 = **WBS** (area-specific growth parameters; “GP₁” for Area 1 and “GP₂” for Area 2).
  + **Single-area (EBS+NBS+WGOA)**: combines EBS/NBS and WGOA; no WBS.
  + **Single-area (EBS+NBS)**: EBS/NBS only.
* **Growth** (PARAMETERS report:5)
  + The **two-area** model estimates **smaller L∞** and **faster K** for Area 1 than the single-area models, while Area 2 (WBS) has its own parameter set.
  + Net effect: in the two-area model, female **length-at-age curves are lower at older ages**, even though they rise faster at young ages. The single-area curves asymptote higher.

**Spawning biomass (SSB) and depletion (1977–2024)**

* **Trajectories are broadly similar in timing across all three models**:
  + A sharp rise through the mid-1980s.
  + A **sustained slide in the early–mid 1990s**, with **depletion below ~0.4**.
  + Another **low around 2008–2010**.
  + **Recovery into the mid–late 2010s**, peaking just before 2018.
  + **Decline after ~2018** toward 2024.
* **Level differences**:
  + **EBS+NBS+WGOA** sits consistently **above EBS+NBS** (same shape, larger scale) because it includes WGOA biomass.
  + The **two-area** total shows **slightly lower SSB during some lows** and a touch more variability (the WBS component introduces extra ups/downs), but the major turning points line up.

**Recruitment (age-0)**

* The **timing of strong and weak cohorts matches well across models** (peaks and troughs occur the same years).
* **Magnitude differs modestly** with model structure (area splitting and growth scaling alter absolute numbers), but **no model shifts the cohort timing**—the big story is shared across all three.

**Exploitation/Fishing mortality**

* Using **Annual F (F=Z–M)** and fleet-specific F from EXPLOITATION report:14:
  + **EBS/NBS fishery F** rises through the 1990s, **peaks around the late 2000s**, then generally trends down into the 2020s in all models.
  + **WGOA fishery F** stays **low** throughout (order 0.1 or less), with a small bump ~2010.
  + **WBS fishery F** is **volatile with several large spikes** (notably mid-1980s, ~2000–2002, and ~2021–2023). Those spikes help explain why the two-area model’s **annual F total** shows sharper peaks when WBS is included.

**How much do WGOA and WBS add?**

From **DERIVED\_QUANTITIES report:6** (Dead\_Catch\_SPR interpreted as **Catch₄₀%**; SSB\_unfished as **SSB₀**):

* **Totals (ALL)**: SSB₀ = **1,533,290 t**; Catch₄₀% = **263,864 t**.
* **EBS+NBS base** (single-area): SSB₀ = **1,086,510 t**; Catch₄₀% = **172,605 t**.
* **WGOA incremental contribution** (EBS+NBS+WGOA minus EBS+NBS):
  + **SSB₀:** **+194,530 t** (**12.7%** of ALL)
  + **Catch₄₀%:** **+32,971 t** (**12.5%** of ALL)
* **WBS incremental contribution** (ALL minus EBS+NBS+WGOA):
  + **SSB₀:** **+252,250 t** (**16.5%** of ALL)
  + **Catch₄₀%:** **+58,288 t** (**22.1%** of ALL)

**Interpretation:** relative to its biomass share, **WBS contributes a larger share of Catch₄₀%** than WGOA—consistent with the higher and more variable **WBS fishery F** and/or higher yield per unit biomass in that area. **WGOA’s role** is steady: a **~13% uplift** to both biomass and SPR-based catch.

**Bottom line**

1. **Trends over time are consistent across all three models**: same inflection points, same recovery/decline phases. Differences are mostly in **scale**, not timing.
2. **Adding WGOA** primarily **rescales the system upward** (more biomass and catch potential) without changing trend timing.
3. **Adding WBS** brings **more variability and higher exploitation spikes**; it also raises total SPR-based catch **disproportionately** relative to its biomass share.
4. **Growth** is the clearest structural difference: the two-area model’s **lower L∞ / higher K** (Area 1) produces **shorter older fish** despite quicker early growth; **WBS (Area 2)** has its own curve distinct from EBS/NBS+WGOA.
5. The **depletion signal** is robust across model structures: **low in early 1990s and late 2000s**, **>0.4 in the mid-2010s**, and **easing downward after 2018**.