ANNEXURE 4:

(Initial) GENETIC BEST MANAGEMENT PRACTICE GUIDELINES FOR MARINE FINFISH HATCHERIES IN SOUTH AFRICA

BACKGROUND:

It is envisaged that finfish farming, in particular kob farming, will increase significantly in the near future. It is therefore, important to minimize the potential genetic impact on the wild populations as much as possible for these two species. It is against this background that the Department of Agriculture, Forestry and Fisheries propose the following best management practice guidelines for silver and dusky kob.

SILVER KOB (ARGYROSOMUS INODORUS):

Argyrosomus inodorus is a southern African endemic that occurs from northern Namibia to the southern Transkei, seldom deeper than the 150 m depth contour. Three stocks have been identified in South African waters, one in the southwestern Cape (Cape Agulhas westwards), one in the southern Cape (Cape Agulhas to Cape St Francis) and one in the southeastern Cape (Cape St Francis to the Kei River mouth) (Griffiths, 1997b). The linkages between the Namibian and southwestern Cape stocks are unknown therefore; it would be prudent to treat the West Coast population as a separate stock. To avoid overlap and for certainty in the stock identity of the fish caught, harvesting of broodstock should be as close to the centre of the stock’s range as possible. Consequently, it is recommended that harvesting be confined to within 100 km either side of the centre of the range of each stock of A. inodorus. The broodstock source area should be the one geographically closest to the geographical location of the grow-out facility.

DUSKY KOB (ARGYROSOMUS JAPONICUS):

Argyrosomus japonicus occur along the eastern seaboard of southern Africa, to India and Pakistan and along the south coast of Australia. Its South African range extends from Cape Point eastwards into Mozambique. Stock structure and distribution is more complex than A. inodorus in that a large proportion of the adult population migrates to KwaZulu-Natal to spawn, while some spawning also takes place in the southern and south eastern Cape (Griffiths,
1997a). Commercial catch returns and tagging data suggested a single stock (Griffiths, 1995), while initial genetic (mitochondrial DNA) data revealed that high levels of diversity (haplotype and nucleotide diversity) exist for the dusky kob (Klopper, 2005). More recent genotyping using microsatellite markers developed specifically for dusky kob (Mirimin et al., 2013) confirm the findings of Griffith (1995), suggesting the presence of a homogeneous genetic stock of dusky kob along the South African coastline (Mirimin et al., unpublished data).

As with *A. inodorus*, it is recommended that the broodstock source area should be as close to the geographical location of the grow-out facility as possible. The northern KZN boundary for this species is due to most of the stock of squaretail kob (*Argyrosomus thorpei*) occurring to the north of Durban.

These (Initial) genetic BMP guidelines will be applied to allow commercial projects to continue, during which time;

A) the comprehensive genetic study will be completed on wild and farmed populations of kob species, and

B) comprehensive Genetic BMP Guidelines will be drawn up which are to be guided by the genetic study on wild marine finfish populations.

GUIDELINES:

1 (Initial) GENETIC BMP GUIDELINES FOR MARINE FINFISH HATCHERIES:

1.1) In order to retain a healthy genetic profile it is recommended that an effective broodstock population size of between 30 and 100 individuals are kept in the hatchery with an internationally recommended effective broodstock population size being 150.

1.2) A rotational breeding program must be implemented. This is usually achieved by rotating the male fish in the hatchery;

1.3) If the proposed grow-out facility that will receive fingerlings from the hatchery is an open system (net pen/flow through) or a closed (recirculation) system below the 100 year flood line, then it is preferable that the broodstock or parent fish are sourced from the area in which the grow-out will take place (see Tables 1 and 2 below). This does not apply to closed (recirculation) land-based systems above the 100 year flood line where the outflow is 10% or less per day of the total volume of the production system and can be controlled and adequately screened.
Table 1: Suggested broodstock harvesting areas for silver kob (*Argyrosomus inodorus*)

<table>
<thead>
<tr>
<th>Stock</th>
<th>Broodstock harvesting area</th>
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<tbody>
<tr>
<td>South-eastern Cape</td>
<td>Port Elizabeth to East London</td>
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<tr>
<td>Southern Cape</td>
<td>Stilbaai to Knysna</td>
</tr>
<tr>
<td>South-western Cape</td>
<td>Cape Point to Gansbaai</td>
</tr>
<tr>
<td>West Coast</td>
<td>Saldanha</td>
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Table 2: Suggested broodstock harvesting areas for dusky kob (*Argyrosomus japonicus*)

<table>
<thead>
<tr>
<th>Stock</th>
<th>Broodstock harvesting area</th>
</tr>
</thead>
<tbody>
<tr>
<td>South African</td>
<td>Breede River to Kosi Bay (Excluding MPAs)</td>
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</table>

1.4) An independently auditable traceability and stock management system is implemented in the hatchery;

1.5) If guideline 1.1 cannot be applied then it is recommended that a broodstock replacement program is implemented.

2 GENETIC BMP GUIDELINES FOR MARINE FINFISH HATCHERIES:

Comprehensive Genetic BMP Guidelines are to be developed for the farmed marine finfish industry on completion of the Kob Genetics study conducted by the Department.
REFERENCES:


DEAT. – Stock Distribution of silver kob (Argyrosomus inodorus) and dusky kob (A. japonicus)


Klopper, A., 2005 - Intraspecific genetic variation in the percoid teleosts Argyrosomus japonicus (Temminck & Schlegel, 1843) and Pomadasys commersonii (Lacepède, 1801), as inferred from the mitochondrial control region. MSc Thesis, University of Pretoria, Pretoria, 72pp.


VINE, N. 2007 – Genetic implications in the translocation of dusky kob (Argyrosomus japonicus) broodstock and juveniles along the South African coast. Dept. of Ichthyology & Fisheries Science, Rhodes University, Grahamstown.