

# hanalei

MOON + TIDE CALENDAR

2 0 1 9

# Aloha mai!

This calendar was developed through a partnership between the Hanalei community, the Hanalei Watershed Hui, Papahānaumokuākea Marine National Monument, the Hawaiian Islands Humpback Whale National Marine Sanctuary, the Department of Land and Natural Resources Division of Aquatic Resources, and the Waipā Foundation.

Traditional Hawaiian knowledge about fish spawning was based on lunar cycles and seasonal changes. Observations provided in this calendar can be used to better care for our reef fish population in Hanalei.

# Hanalei Tides

The tides presented in this calendar are the subordinate tide predictions for Hanalei Bay. These predictions are based on harmonic data from Nāwiliwili Bay.

# Hawaiian Moon Phases

Many calendars are based on the synodic month, a 29.53 day average orbital period of the moon. In this calendar, the moon phase of Hilo was aligned with the astronomical new moon as determined by the U.S. Naval Observatory. The moon phase of Muku was combined with the Hilo phase where appropriate.



# FISHING SEASON TABLE



	Āholehole	Manini	'Ōmilu	'Ōpelu	Akule	Halalū	Moi	Ula	Ula Pāpapa	Kona Crab	'Ama'ama
JANUARY	!	-	-	-	-	-	📏	-	-	-	✗
FEBRUARY	!	-	-	-	-	-	📏	-	-	-	✗
MARCH	!	!	-	-	-	-	📏	-	-	-	✗
APRIL	!	!	!	!	!	-	📏	-	-	-	-
MAY	-	!	!	!	!	-	📏	✗	✗	✗	-
JUNE	-	!	!	!	!	-	✗	✗	✗	✗	-
JULY	-	-	-	!	!	-	✗	✗	✗	✗	-
AUGUST	-	-	-	!	!	📏	✗	✗	✗	✗	-
SEPTEMBER	-	-	-	-	!	📏	📏	-	-	-	-
OCTOBER	-	-	-	-	!	📏	📏	-	-	-	-
NOVEMBER	-	-	-	-	-	-	📏	-	-	-	-
DECEMBER	-	-	-	-	-	-	📏	-	-	-	✗

## TERMS USED IN THIS CALENDAR

### 📏 LIMITED HARVEST

Some species have limited harvest periods, restrictions on harvest method (type of gear), bag limits, and/or minimum sizes.

- Halalū harvesting is limited August to October.
- Moi harvesting is limited September to February.

### ! SUGGESTED LIMITED HARVEST

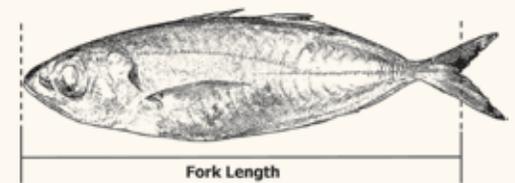
The species listed under suggested limited harvest (SLH) in this calendar are meant to inform fishers when peak spawning may be occurring in Hanalei. These periods are based on observations and gonad data collected in Hanalei. SLH is not a part of Hawai'i fishing regulations. Annual variations are likely to occur, so harvest carefully.

### ✗ CLOSED SEASON

These periods of complete harvest restriction are based on current fishing regulations administered by the State of Hawai'i through the Department of Land and Natural Resources, Division of Aquatic Resources.

A complete list of the regulations can be found at: [dlnr.hawaii.gov/dar/fishing/fishing-regulations](http://dlnr.hawaii.gov/dar/fishing/fishing-regulations)

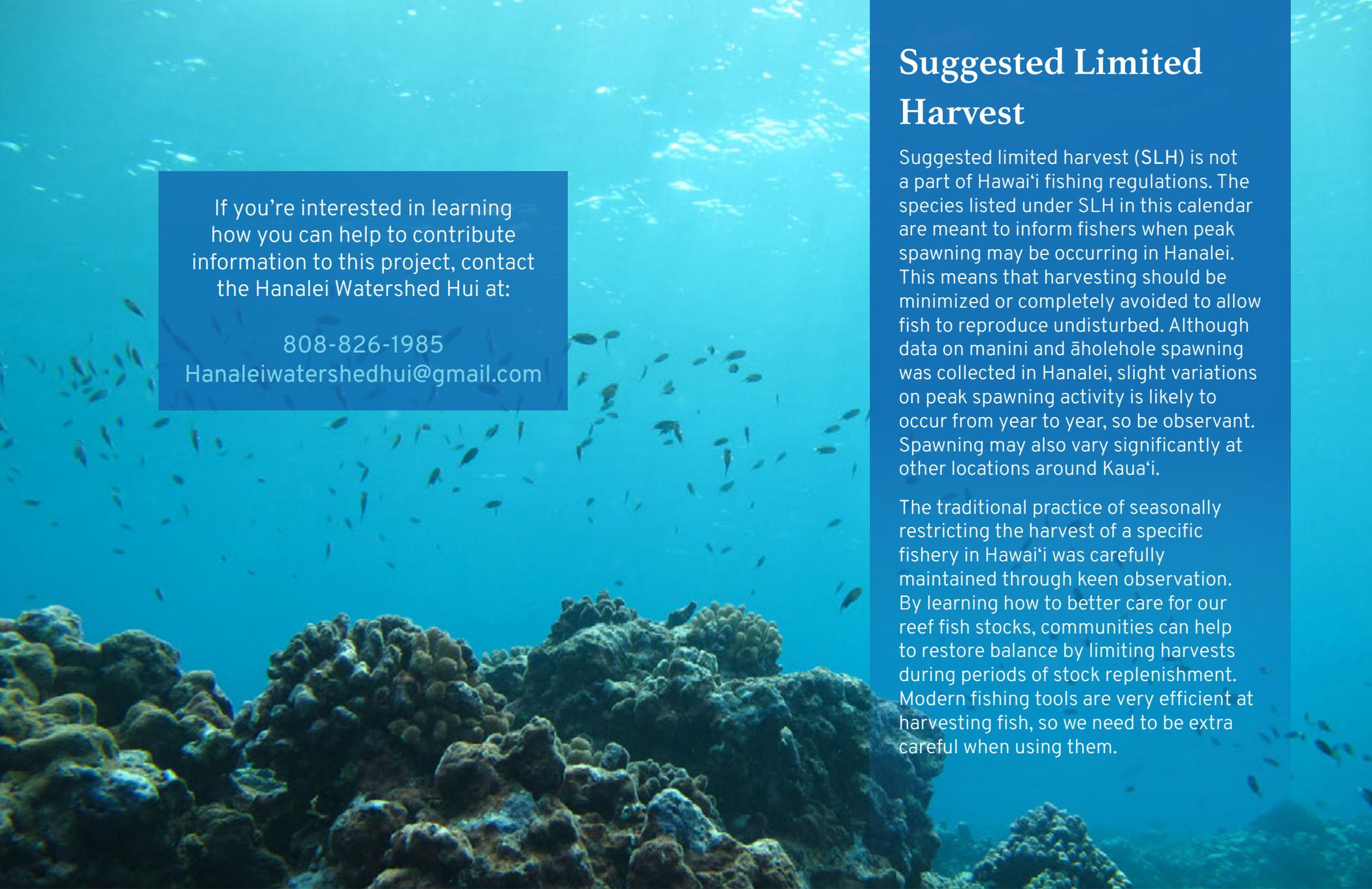
During a closed season for a given species, there is a ban on harvesting, possessing, or selling that species.



**FORK LENGTH:** Measured from fish's snout to base of "V" in tail fin. State regulated species are measured in this way.

**GONAD:** Reproductive organ, male or female.

**L50:** Length at which 50 percent of a species population is reproductively mature.



If you're interested in learning how you can help to contribute information to this project, contact the Hanalei Watershed Hui at:

808-826-1985  
 Hanaleiwatershedhui@gmail.com

## Suggested Limited Harvest

Suggested limited harvest (SLH) is not a part of Hawai'i fishing regulations. The species listed under SLH in this calendar are meant to inform fishers when peak spawning may be occurring in Hanalei. This means that harvesting should be minimized or completely avoided to allow fish to reproduce undisturbed. Although data on manini and āholehole spawning was collected in Hanalei, slight variations on peak spawning activity is likely to occur from year to year, so be observant. Spawning may also vary significantly at other locations around Kaua'i.

The traditional practice of seasonally restricting the harvest of a specific fishery in Hawai'i was carefully maintained through keen observation. By learning how to better care for our reef fish stocks, communities can help to restore balance by limiting harvests during periods of stock replenishment. Modern fishing tools are very efficient at harvesting fish, so we need to be extra careful when using them.

### JANUARY

Āholehole    Manini    'Ōmilu    'Ōpelu    Akule    Halalū    Moi    Ula    Ula Pāpapa    Kona Crab    'Ama'ama



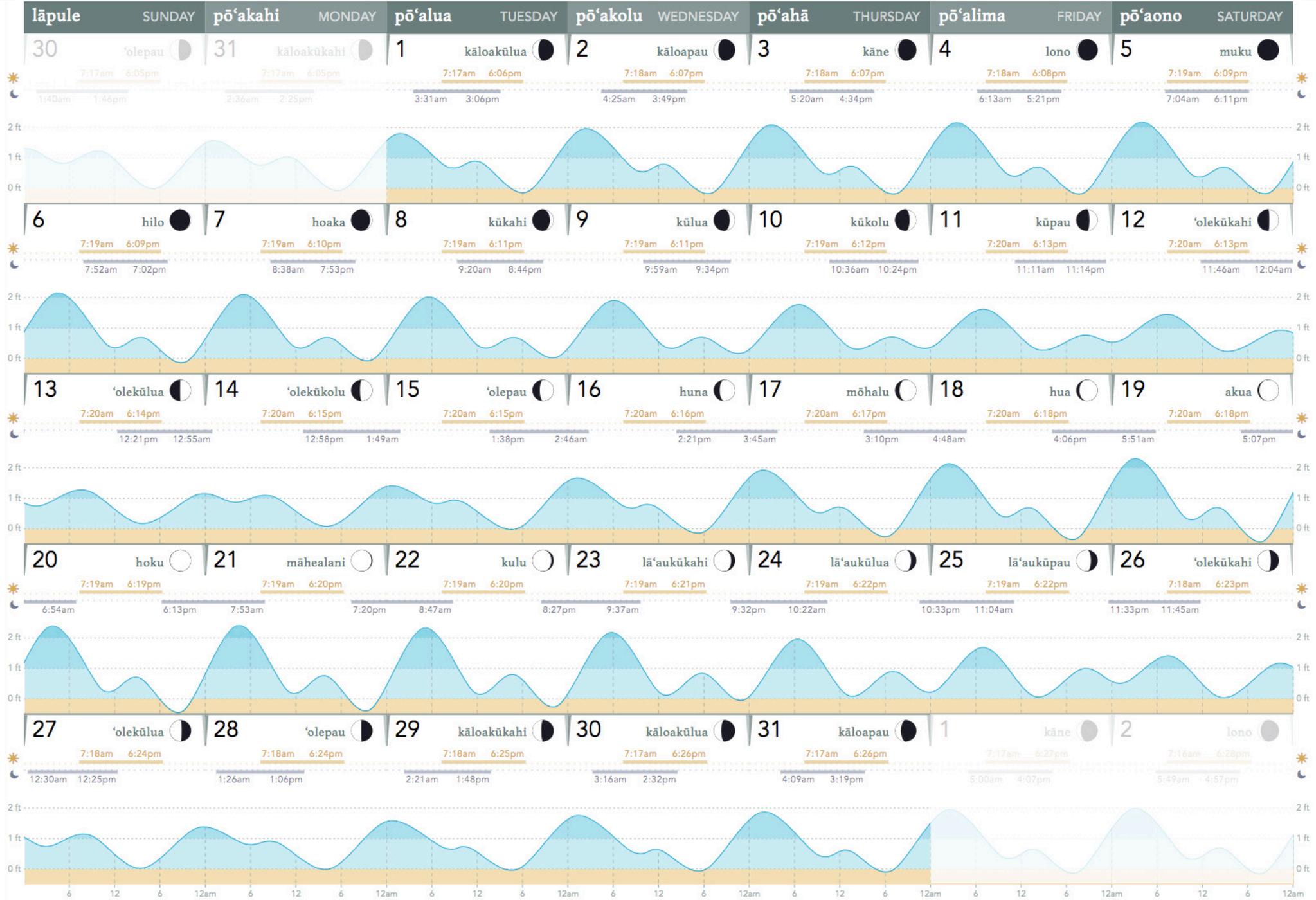
LIMITED HARVEST  
 15/day 11 in. minimum fork length

For more info see the full FISHING SEASON TABLE near the start of the calendar

# ianuali

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# JANUARY



# Wetland Bird Buffet



**Koloa maoli or Hawaiian ducks** *ENDANGERED*

Opportunistic feeders and feed in wetlands and streams with water less than 24 centimeters (9.4 inches) deep. Diet consists of: primarily aquatic invertebrates and plants including snails, insect larvae, earthworms, crayfishes, seeds and leaves of aquatic plants such duckweed, bulrushes, and algae and tadpoles.



**Ae'o or Hawaiian stilts** *ENDANGERED*

Opportunistic feeders that take a variety of prey from mudflats and very shallow water less than 10 centimeters (4 inches) deep. Diet consists of: small aquatic animals, mostly invertebrates such as midges, water boatman, beetles, polychaete worms, and small crabs and occasionally small fishes.



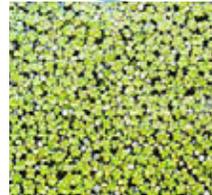
apple snail



saltmarsh bulrush



paddleworm



duckweed



mosquito larvae



prawn



characeae algae



tadpole



**'Alae 'ula or Hawaiian gallinules** *ENDANGERED*

Prefer freshwater wetlands with water depths less than 1 meter (3.3 feet) and dense emergent and shoreline vegetation. Gallinules can be secretive, foraging on plants and invertebrates within dense and floating vegetation. They are opportunistic and their diet consists of: aquatic insects, mollusks, crustaceans, algae, and seeds and leaves of various upland and wetland plants.



**'Alae ke'oke'o or Hawaiian coots** *ENDANGERED*

Generalist feeders, obtaining food from the water surface, by diving to the bottom, picking in mud, sand, and shallow water, and grazing on upland grassy sites near wetlands. They are closely related to Hawaiian gallinules but are less secretive, foraging within dense vegetation and open water. Their diets are also similar to that of gallinules.

FEBRUARY

Āholehole

Manini

'Ōmilu

'Ōpelu

Akule

Halalū

Moi

Ula

Ula Pāpapa

Kona Crab

'Ama'ama



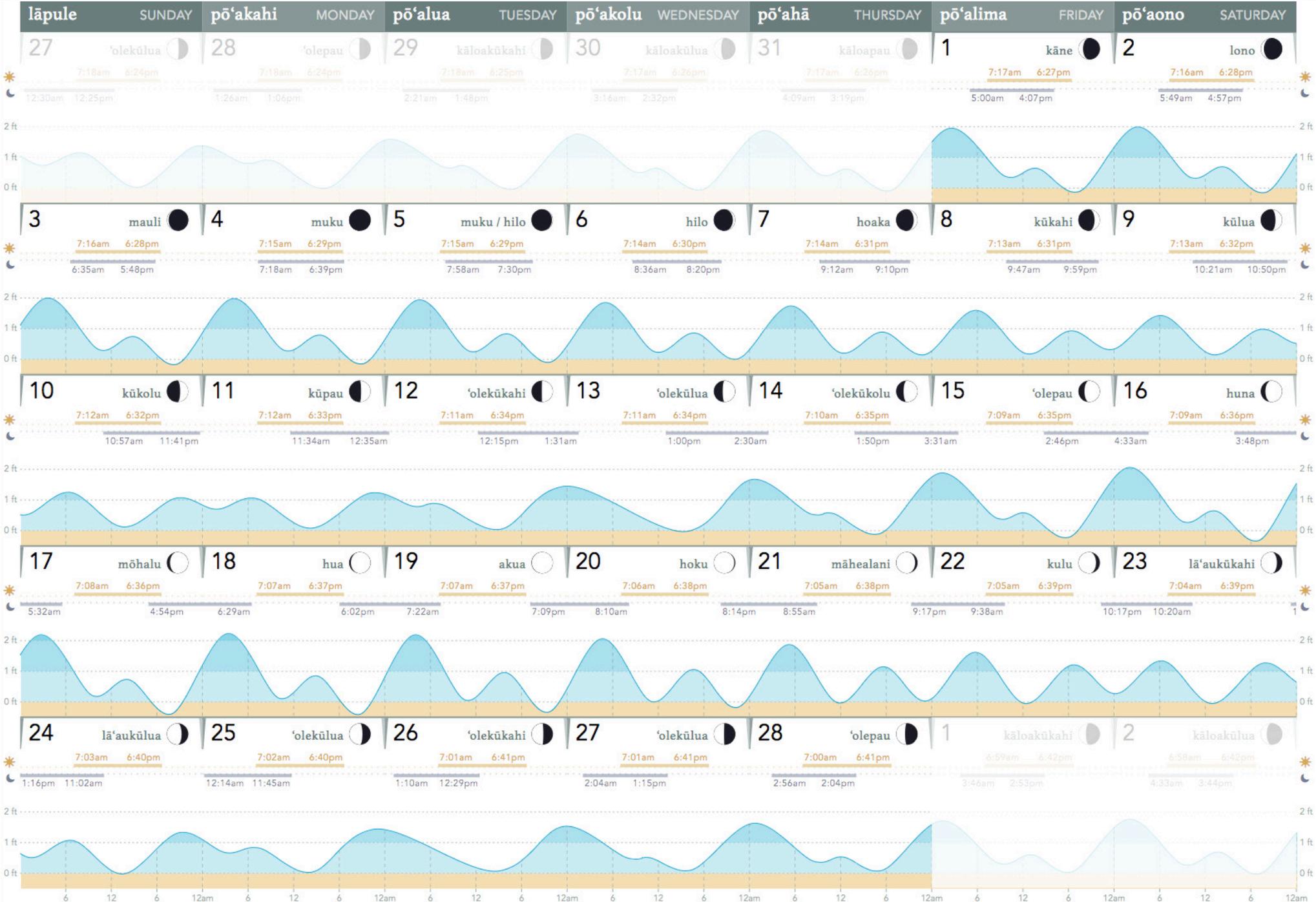
LIMITED HARVEST  
15/day 11 in. minimum fork length

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# pepeluali

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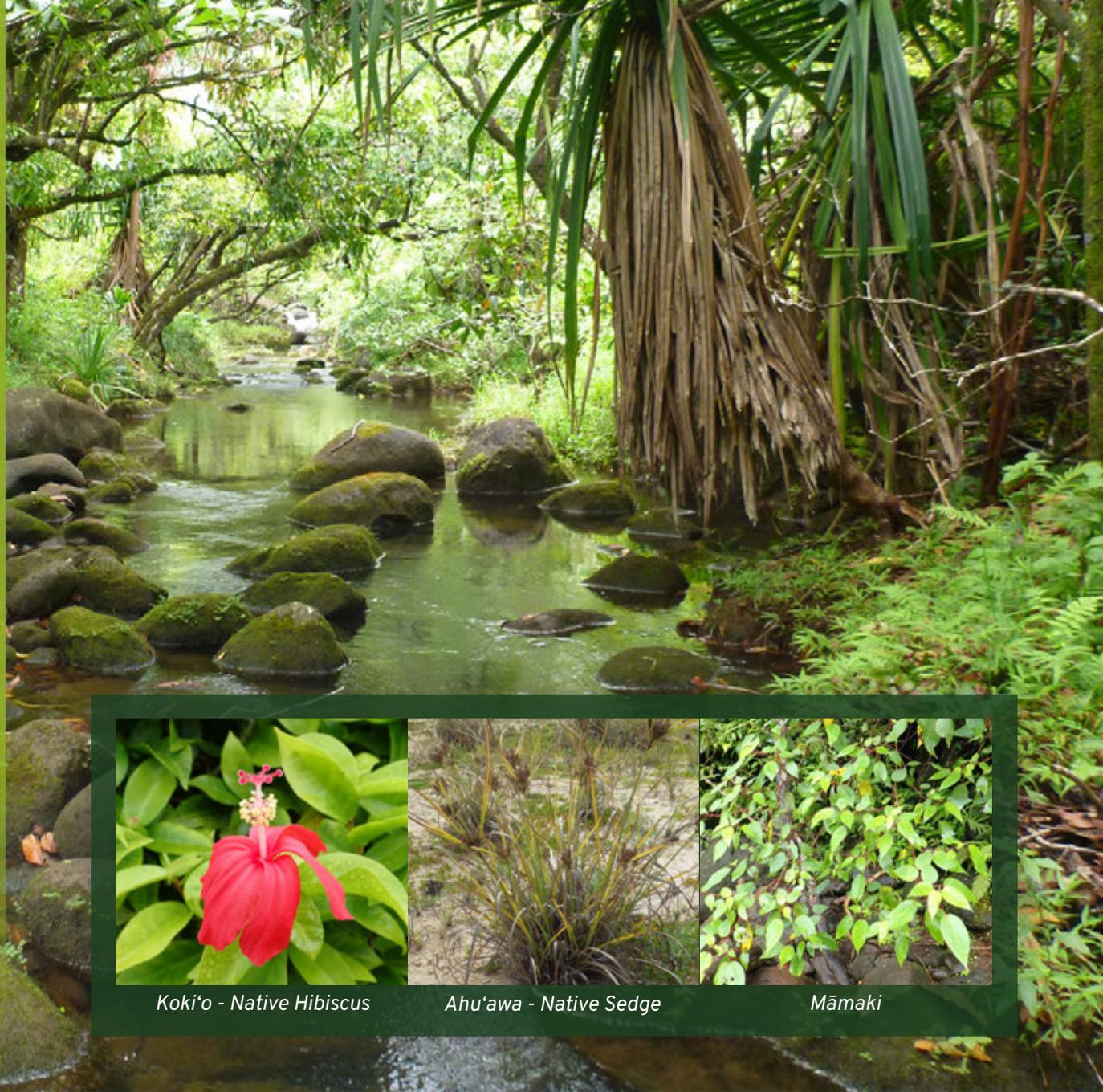
# FEBRUARY



# Planting Natives for our Streams

Streambank vegetation serves many important functions in protecting stream and watershed health. Ideal vegetation should provide shade to keep water temperatures cool for native aquatic organisms, prevent bank erosion, and help to remove sediment and other pollutants from surface runoff. Fast-growing and difficult to maintain species such as Hau are not recommended. Here are a few native species that function well for streambank planting in the environment of Halele'a.

Tree species recommended for streamside floodplain areas above the ordinary high-water level should have dense root systems that provide long-term stability for the stream. A few of these are kukui, hala, and niu (or most other palm species).



Koki'o - Native Hibiscus



Ahu'awa - Native Sedge



Māmaki

MARCH

Āholehole

Manini

‘Ōmilu

‘Ōpelu

Akule

Halalū

Moi

Ula

Ula Pāpapa

Kona Crab

‘Ama'ama



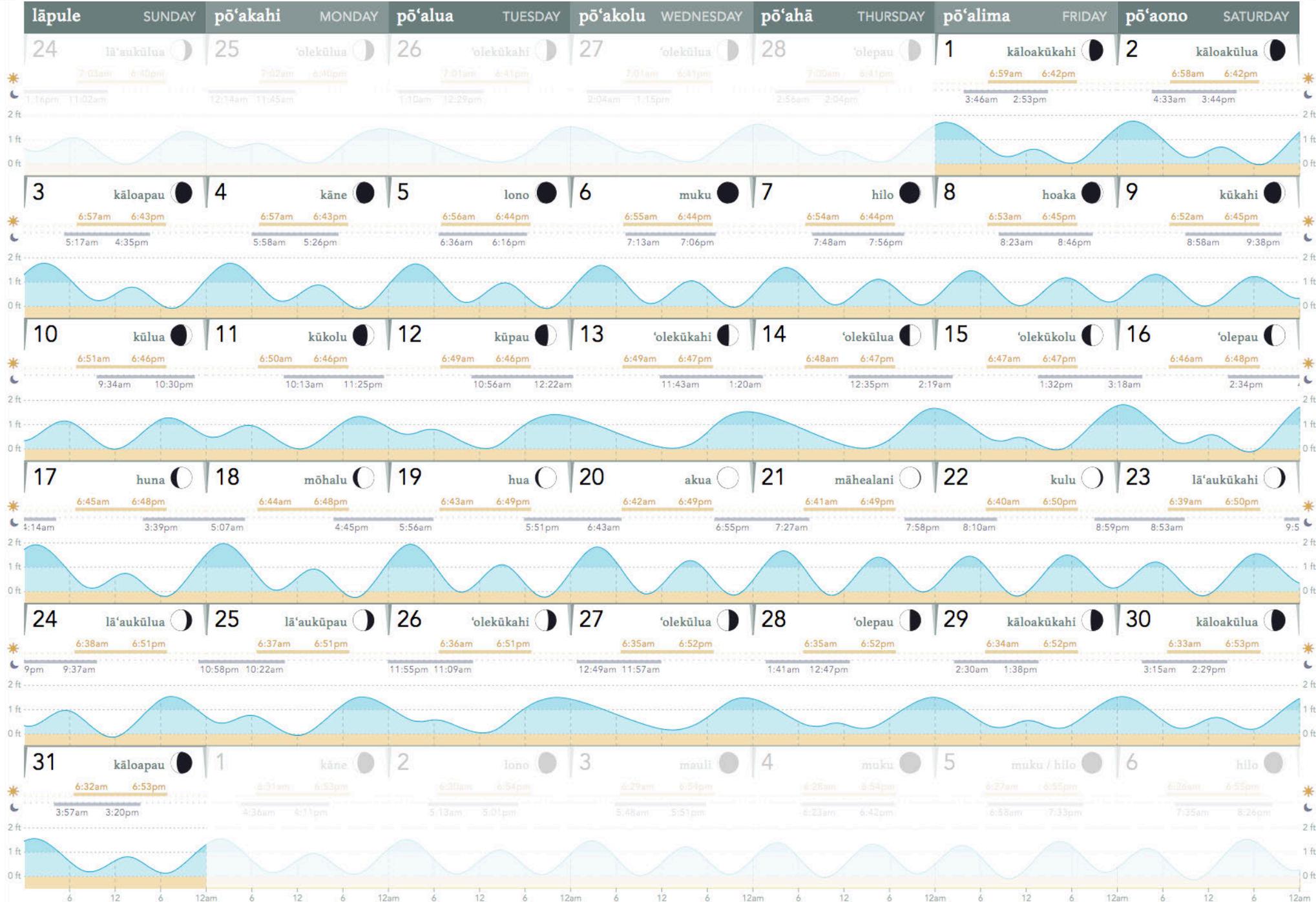
LIMITED HARVEST  
15/day 11 in. minimum fork length

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# malaki

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# MARCH



# Severity of Bleaching

Coral bleaching is a coral's natural response to stress. Several things can cause corals to bleach such as elevated water temperature, pollution, a sudden change in salinity from heavy rains or flooding, sedimentation, disease, and more. The severity of bleaching can range from paling (level 2), to partially bleached (level 3) to completely bleached (level 4). It is important to report when we recognize bleaching on our local reefs. **Observed bleaching can be reported to Eyes of the Reef Hawaii at [www.eorhawaii.org](http://www.eorhawaii.org).**



Level 1



Level 2



Level 3



Level 4

## PONO FISHING TIP

Herbivores play an important role in keeping limu growth in check and allowing corals to recover after stressful events. Moderating harvest of herbivores during bleaching events can help corals recover.

APRIL

Āholehole

Manini

‘Ōmilu

‘Ōpelu

Akule

Halalū

Moi

Ula

Ula Pāpapa

Kona Crab

‘Ama‘ama



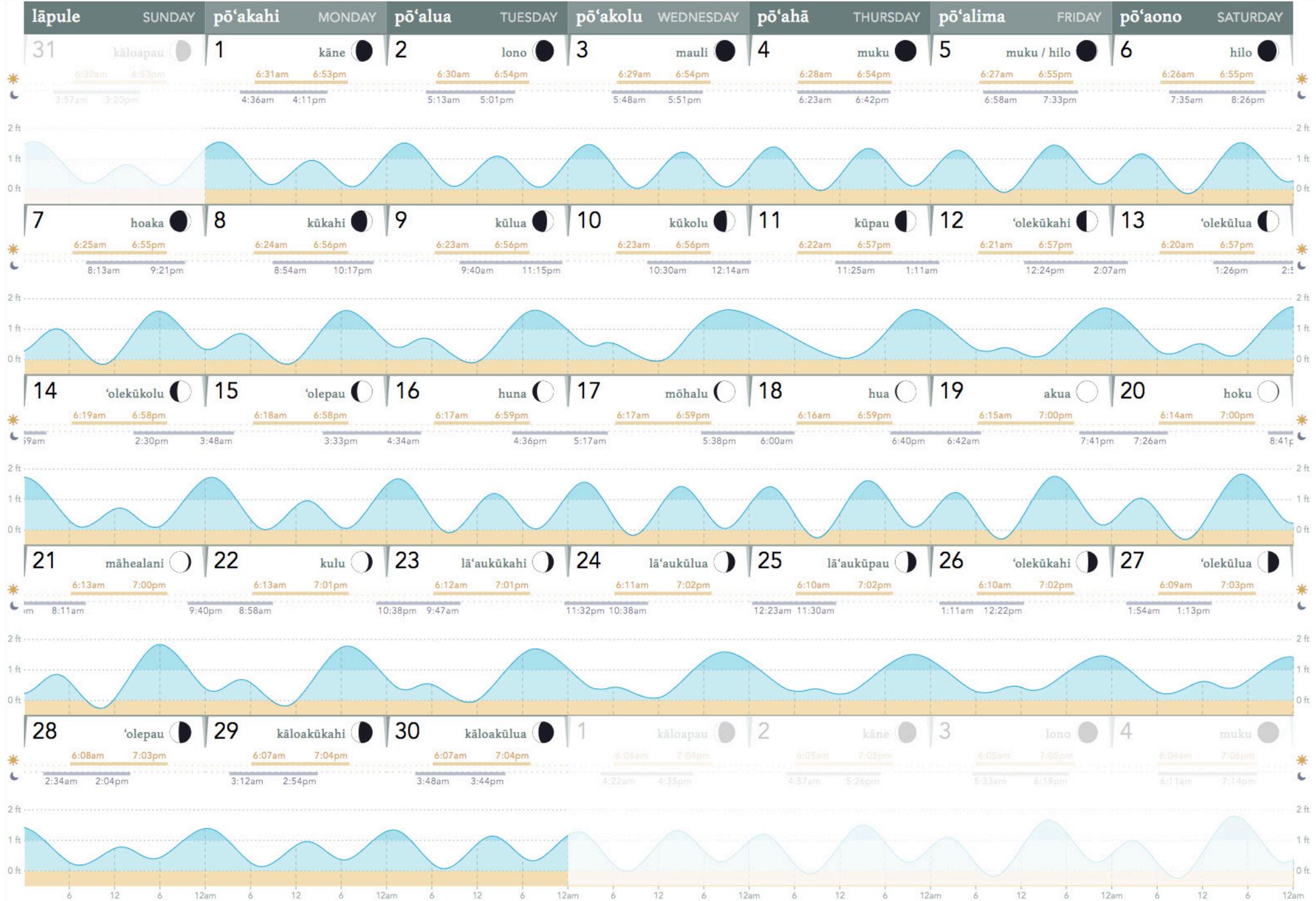
For more info see the full FISHING SEASON TABLE near the start of the calendar

LIMITED HARVEST  
15/day 11 in. minimum fork length

# 'apelila

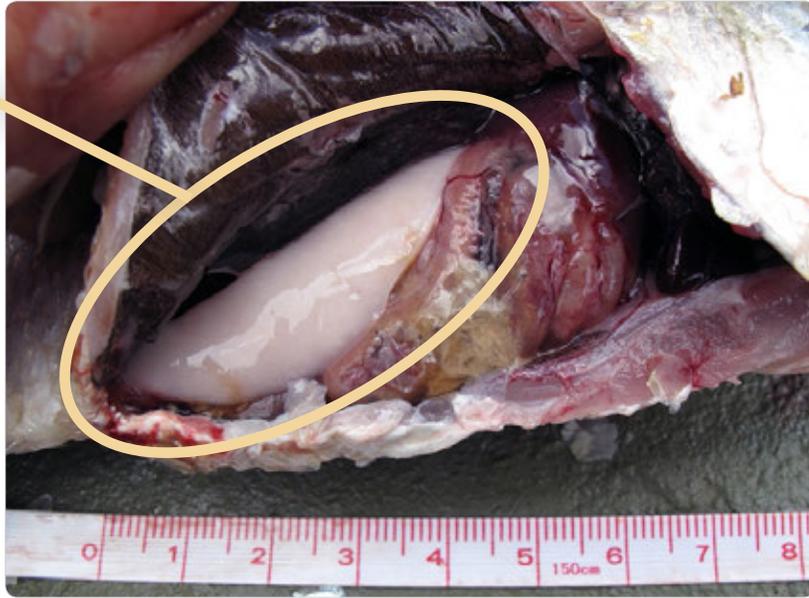
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# APRIL

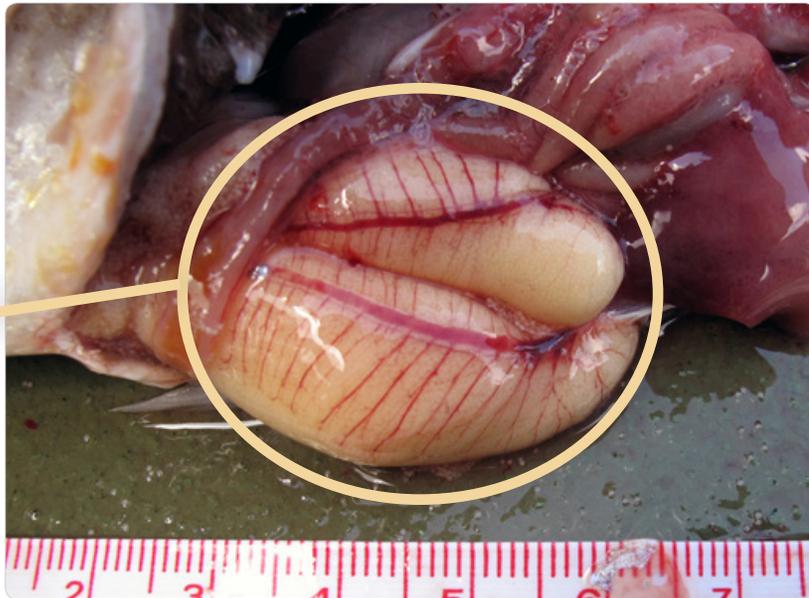


# Fish Gonad Identification

**MALE REPRODUCTIVE**  
**ORGANS** are also important to identify as they indicate spawning when developed.



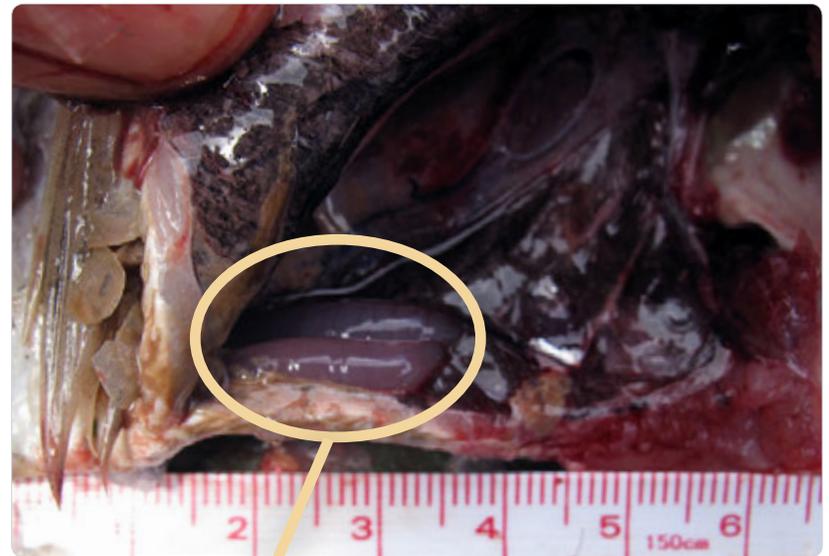
**DEVELOPED EGGS** are yellowish in color with large blood vessels clearly visible.



## FISHING PONO

By learning how to identify the reproductive organs in fish, you can track spawning seasons in your area.

When cleaning your catch look for developed gonads. This can indicate spawning, and harvesting should be limited.



**UNDER-DEVELOPED EGGS** mean fish are most likely not reproducing—this is a good time to harvest. Remember when these seasons occur in your area as each species will spawn at nearly the same time each year.

MAY

Āholehole

Manini

‘Ōmilu

‘Ōpelu

Akule

Halalū

Moi

Ula

Ula Pāpapa

Kona Crab

‘Ama‘ama

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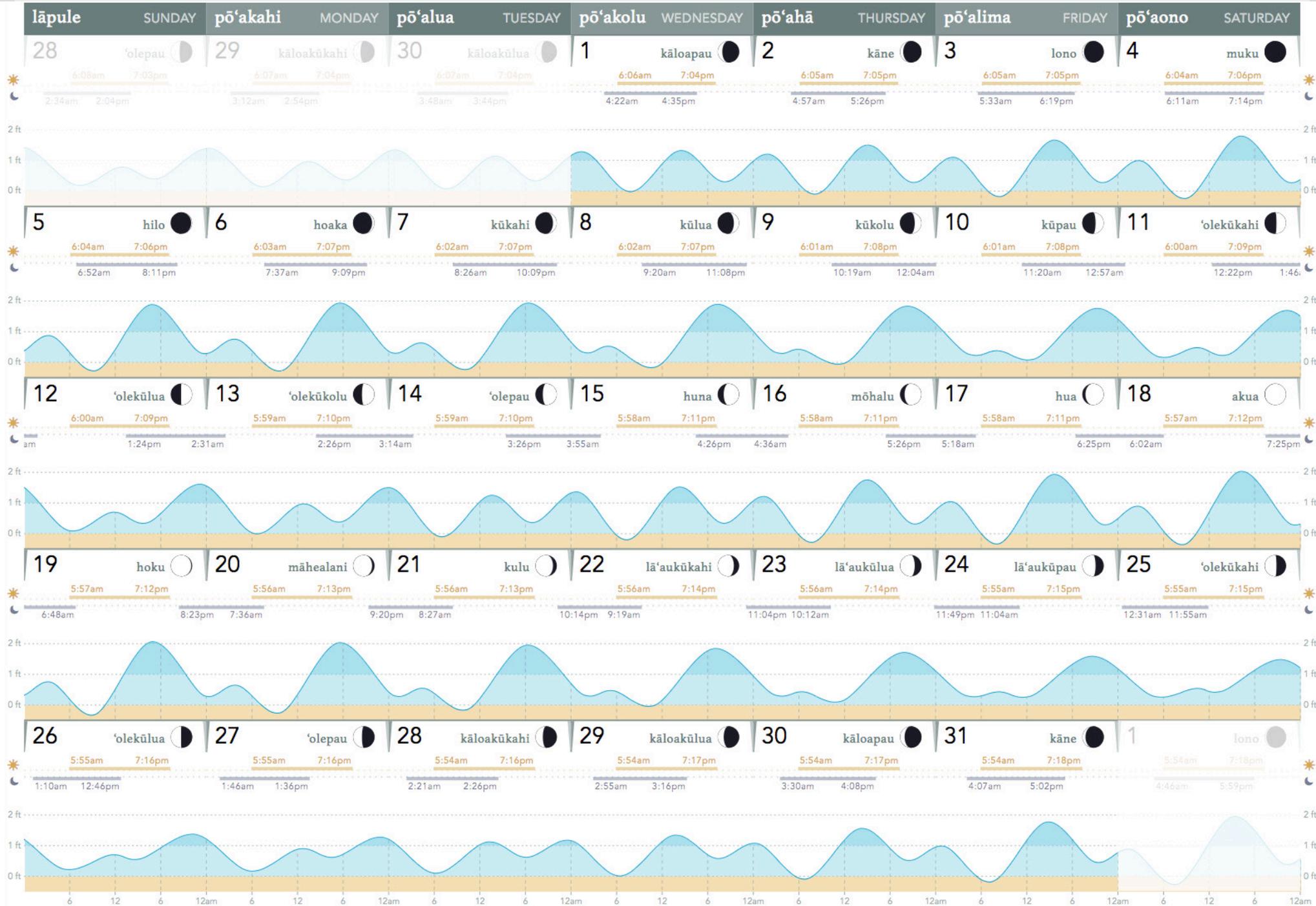
LIMITED HARVEST  
15/day 11 in. minimum fork length

For more info see the full FISHING SEASON TABLE near the start of the calendar

# mei

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# MAY



# Harvest wisely to ensure future catches!

**Slot Limit Catches:** Recognizing the importance of leaving very large individuals of each species.



**Small fish = no take.** Allow to reach reproductive size.



Harvest Pono: One 27" 'ōmilu will produce roughly the same amount of eggs as 87 14" 'ōmilu. **Medium sized are a good choice to fish sustainably.**



**Very large fish = no take.** Larger fish in every species produce much more eggs than fish that have just reached the reproductive size. The yolk reserves in these eggs are also much larger, giving the young that hatch a much better chance of survival.

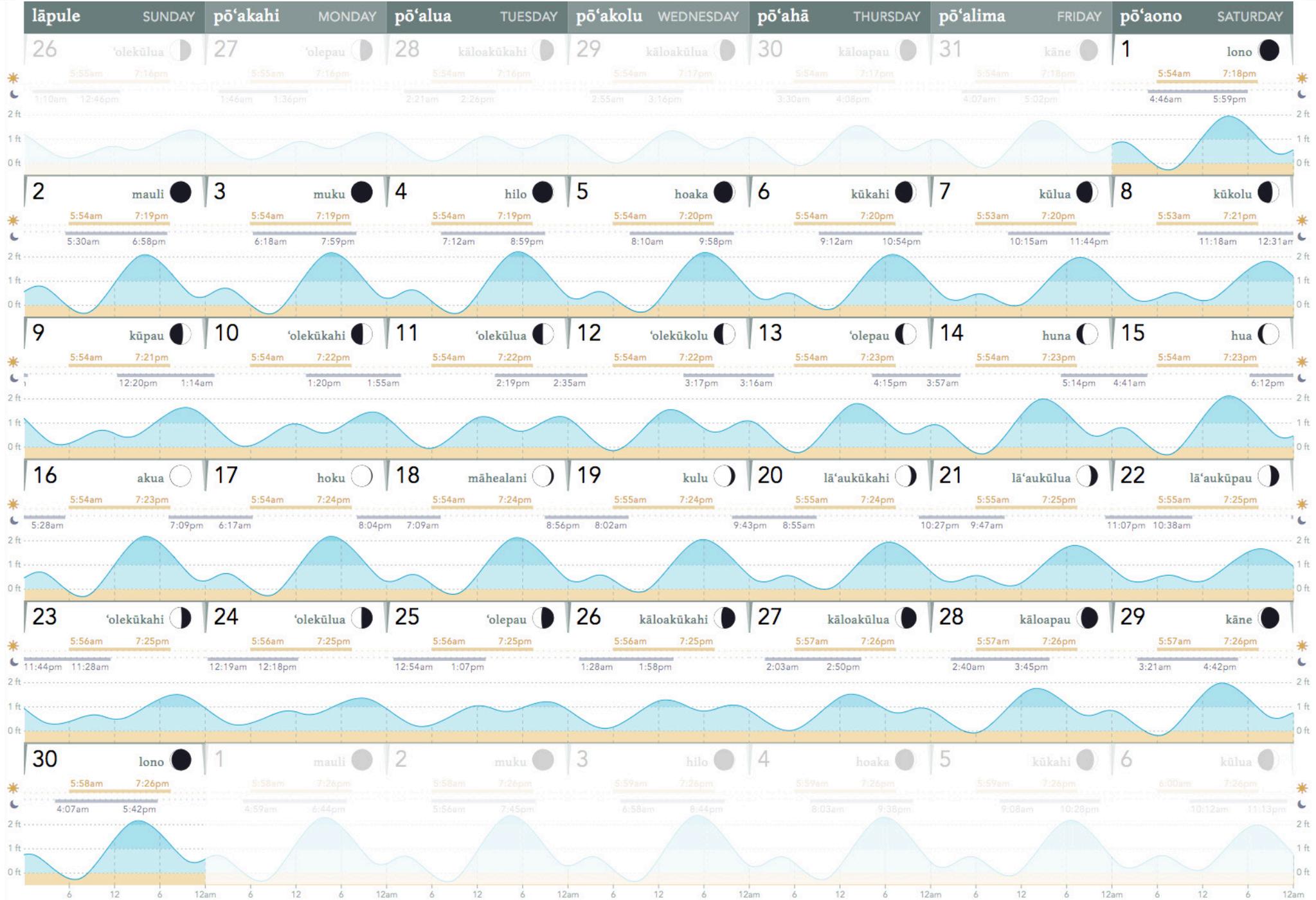
JUNE	Āholehole	Manini	'Ōmilu	'Ōpelu	Akule	Halalū	Moi	Ula	Ula Pāpapa	Kona Crab	'Ama'ama
-	!	!	!	!	-	✗	✗	✗	✗	-	

For more info see the full FISHING SEASON TABLE near the start of the calendar

# iune

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# JUNE



# Mullet Species in Hawai‘i

‘AMA‘AMA LEGAL MINIMUM SIZE  
(Fork Length: Tip of snout to fork in tail)

11"



## ‘Ama‘ama

Striped mullet (*Mugil cephalus*)

Native

Max size: 27" Fork Length (FL), 10 lbs

Legal size- 11" Fork Length

Closed Season: December 1st to March 31st

Bag Limit: 10 per day (Hilo Bay only)



## Kanda

Marquesan mullet (*Moolgarda engeli*)

Introduced

Max size: 10" FL, 3/4 lbs

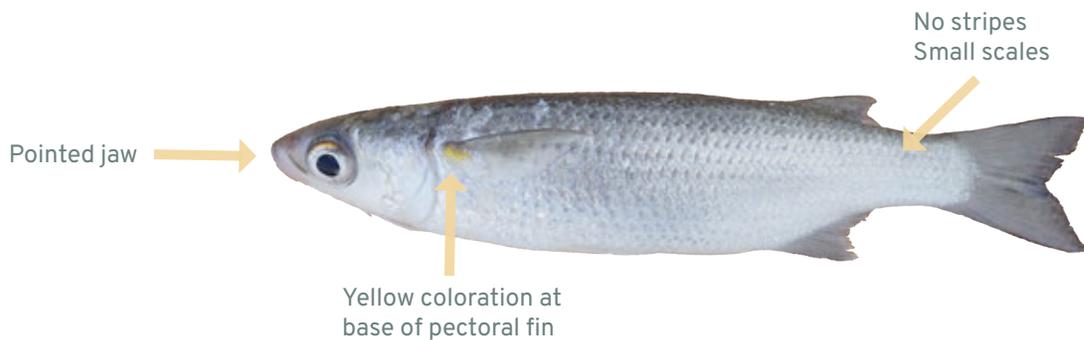
No size restrictions

No closed seasons

No bag limit

## FISHING PONO

Become an invasivore. Introduced species such as kanda mullet, ta‘ape, and to‘au are often overlooked as desirable food fish, but are quite tasty.



## Uouoa

Sharp-nose mullet (*Neomyxus leuciscus*)

Native

Max size: 12" FL, 1 lbs

No size restrictions

No closed seasons

No bag limit

JULY

‘Āholehole

Manini

‘Ōmilu

‘Ōpelu

Akule

Halalū

Moi

Ula

Ula Pāpapa

Kona Crab

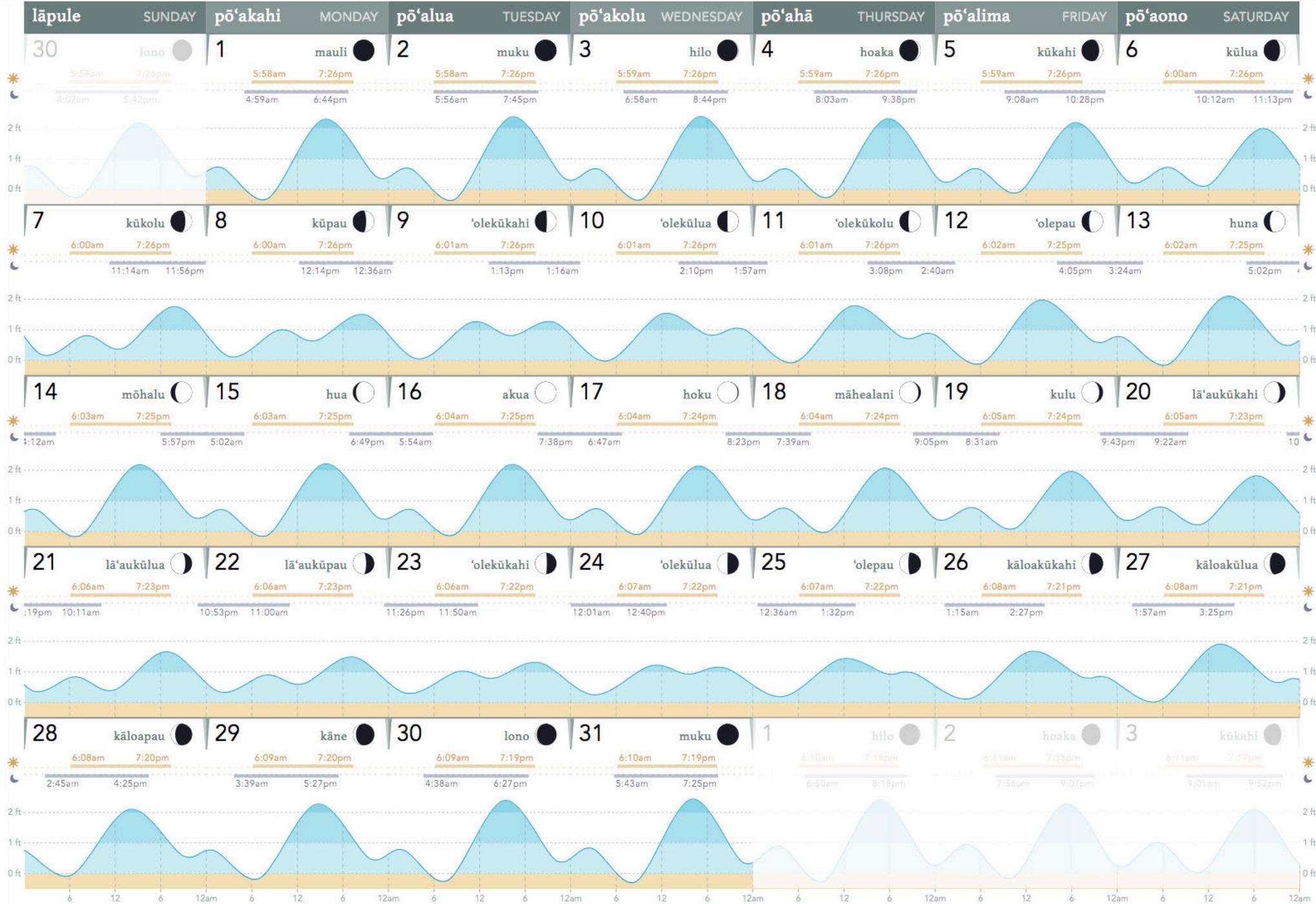
‘Ama‘ama



For more info see the full FISHING SEASON TABLE near the start of the calendar

# iulai

# JULY

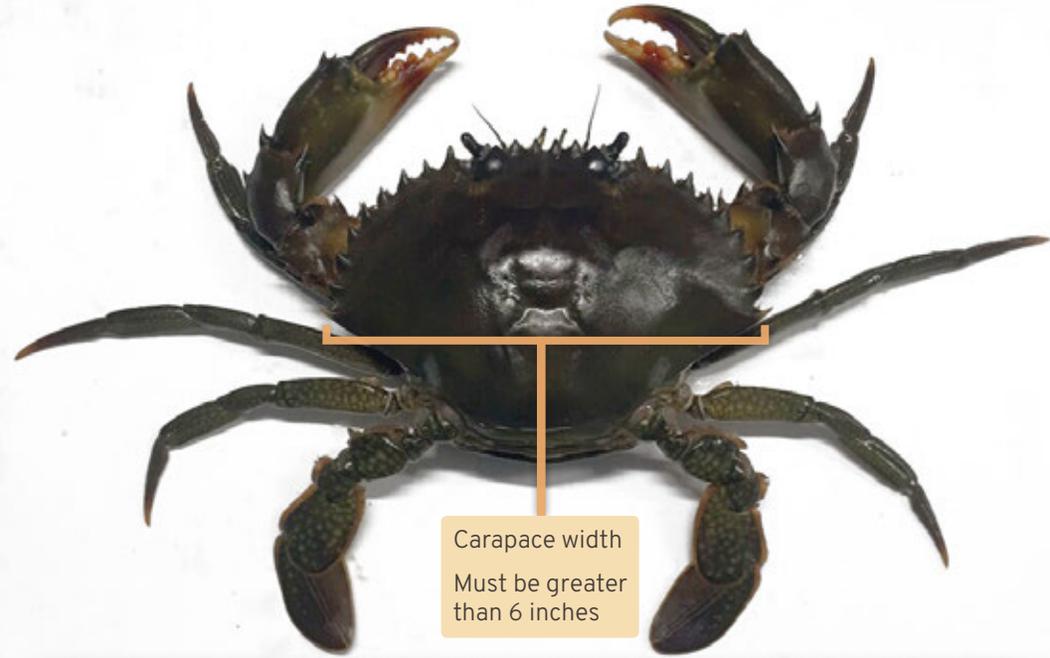


# Determining the Gender of Crabs

Pictures show how to identify male and female Samoan crabs.

Samoan crab harvest regulations:

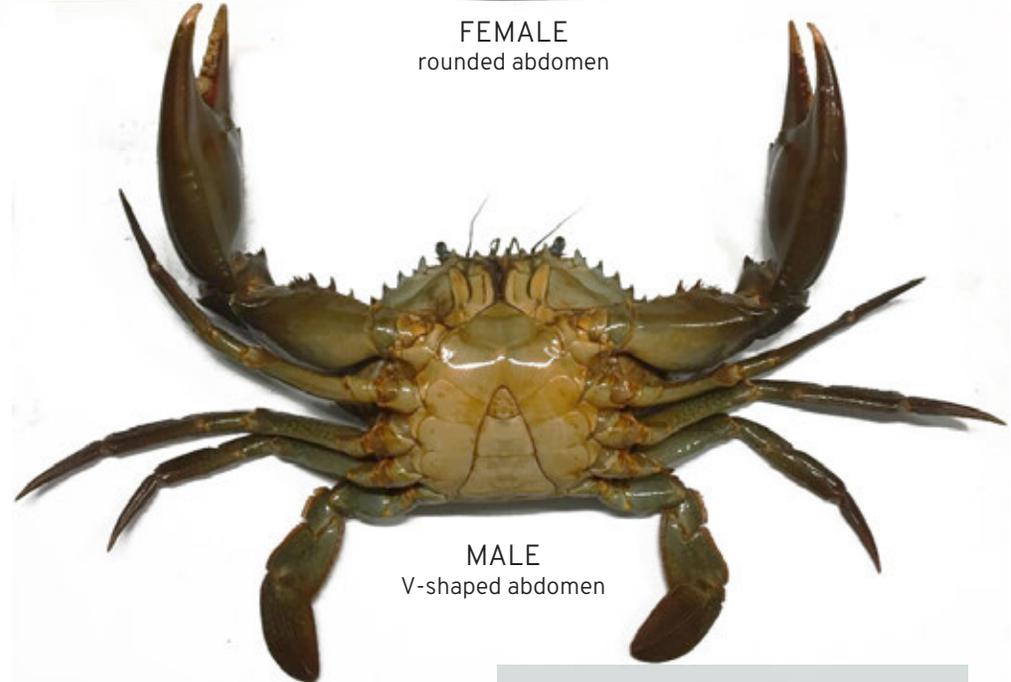
- Minimum size: 6 inches
- No spearing



Carapace width  
Must be greater than 6 inches



FEMALE  
rounded abdomen



MALE  
V-shaped abdomen

## HARVEST PONO

Female crabs are illegal to harvest. Learning how to identify male crabs from females and developing females can help to prevent accidental harvesting of female crabs.

More information on harvest regulations of other crab species can be found at:  
<http://dlnr.hawaii.gov/dar/fishing/fishing-regulations/marine-invertebrates/>

CRAB PHOTOS BY: Domingo Norial Jr.

AUGUST

Āholehole

Manini

‘Ōmilu

‘Ōpelu

Akule

Halalū

Moi

Ula

Ula Pāpapa

Kona Crab

‘Ama‘ama

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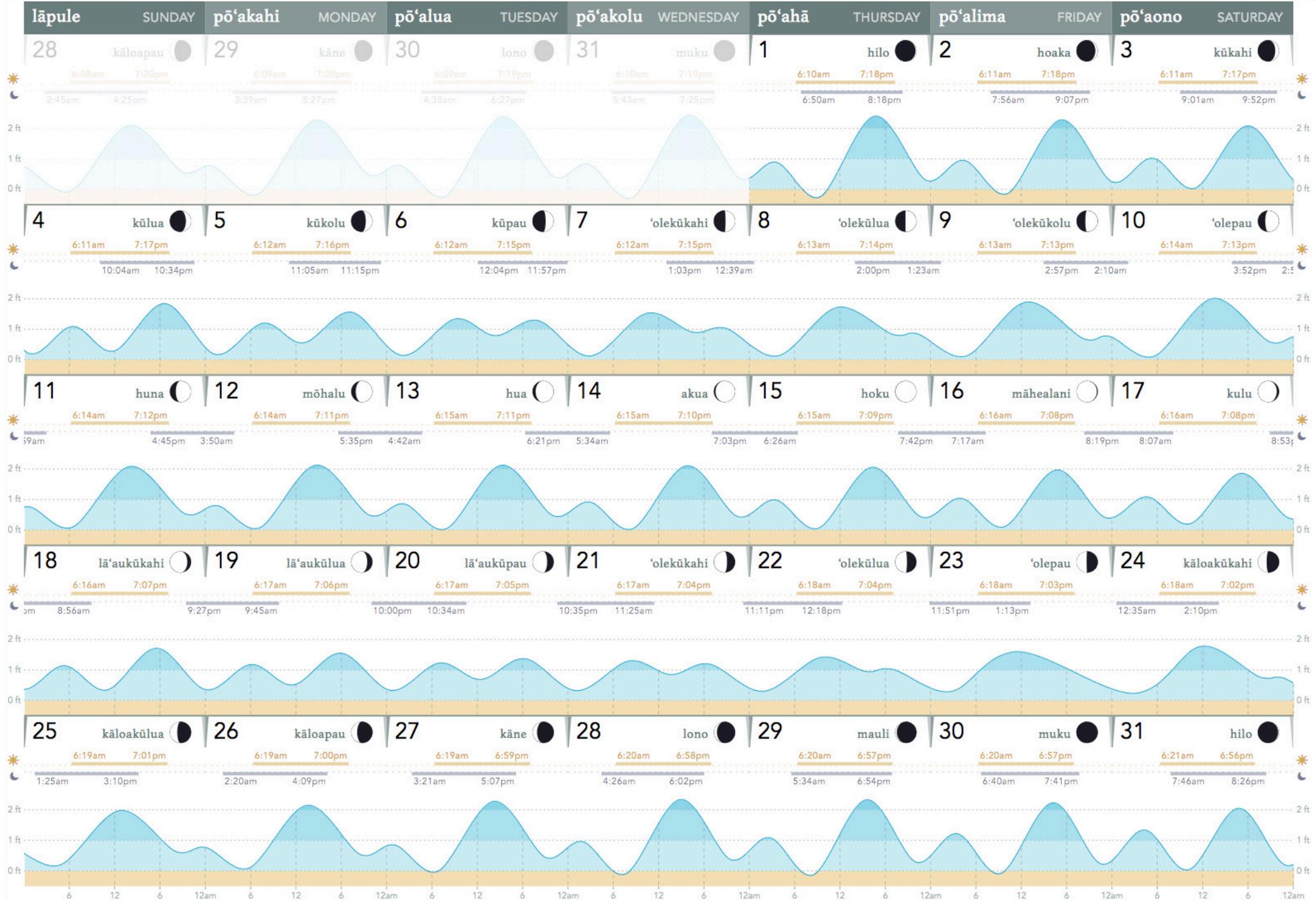
LIMITED HARVEST  
State restrictions apply

For more info see the full FISHING SEASON TABLE near the start of the calendar

# 'aukake

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# AUGUST



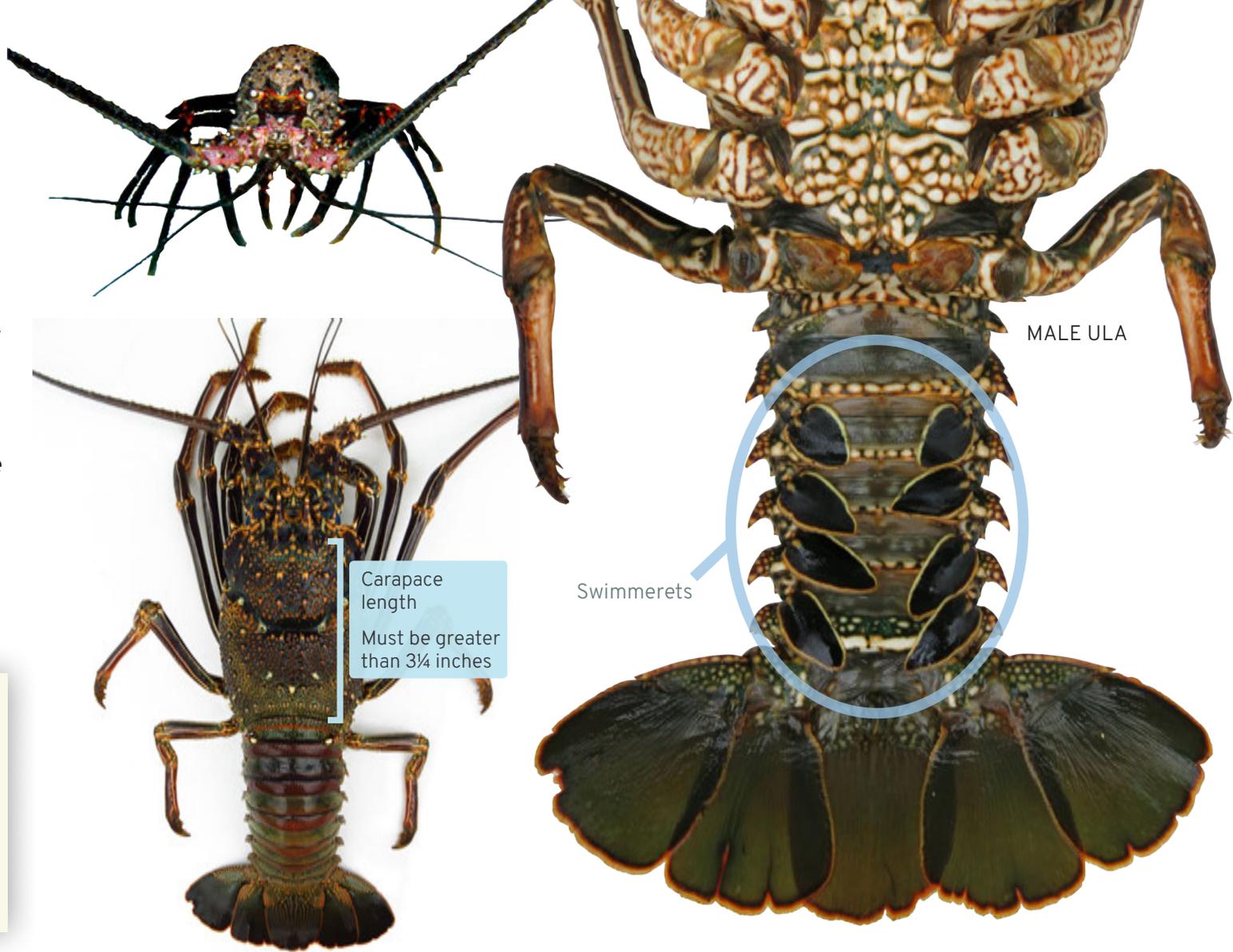
# Ula

Only male ula greater than 3¼ inches in carapace length are legal to harvest from September thru April. Here's how to identify males from females:

Female lobsters carry eggs in their swimmerets during spawning season. It can be hard to tell if a lobster is male or female from the top, so that's why spearing is illegal.

Harvesting females is prohibited. Using a spear to harvest is prohibited.

**FISHING PONO**  
 Measure your catch and release females. These regulations are needed because ula are slow-growing animals that are prone to over-harvesting.



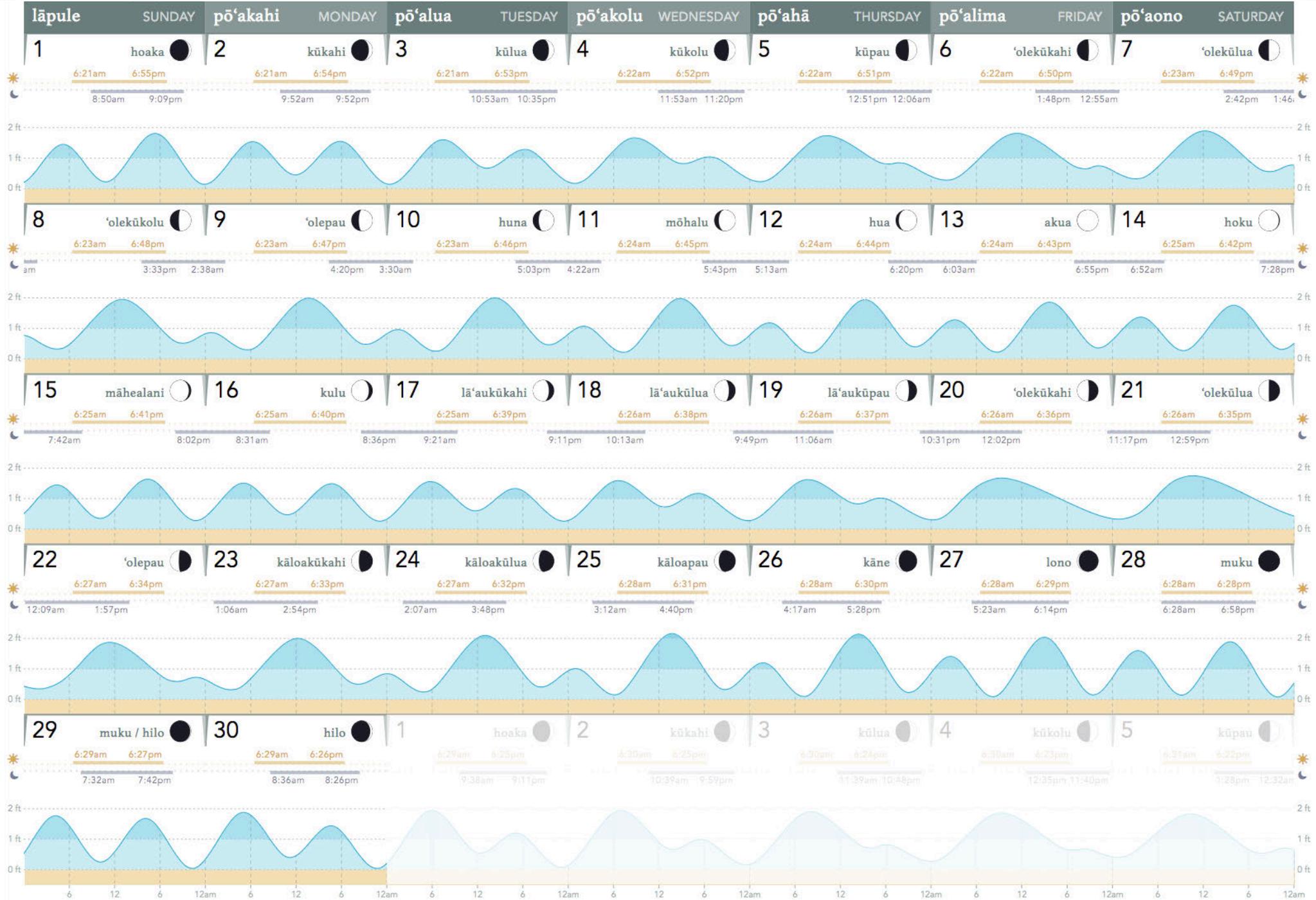
More information on determining the sex of lobster as well as various species of crabs can be found at: [dlnr.hawaii.gov/dar/fishing/fishing-regulations/marine-invertebrates/how-to-determine-sex-of-regulated-invertebrates/](http://dlnr.hawaii.gov/dar/fishing/fishing-regulations/marine-invertebrates/how-to-determine-sex-of-regulated-invertebrates/)

SEPTEMBER	Āholehole	Manini	‘Ōmilu	‘Ōpelu	Akule	Halalū	Moi	Ula	Ula Pāpapa	Kona Crab	‘Ama‘ama
For more info see the full <b>FISHING SEASON TABLE</b> near the start of the calendar	—	—	—	—	!			—	—	—	—
					LIMITED HARVEST State restrictions apply	LIMITED HARVEST 15/day 11 in. minimum fork length					

# kepakemapa

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# SEPTEMBER



# Harvest wisely to ensure future catches!

Know your fish before you harvest. **Uhu: no blue for you!**



MALE PŌNUHUNUHU

All species of uhu live in family groups called harems, which are comprised of one male (primarily blue) and several females (more reddish with white tail section).

If the male is removed from the harem, the largest female will undergo a sex change and turn into the lead male. This change takes several months and can disrupt the spawning cycle.



FEMALE PŌNUHUNUHU

**Harvesting only medium sized females** helps limit the impact on the harems and their spawning cycles.

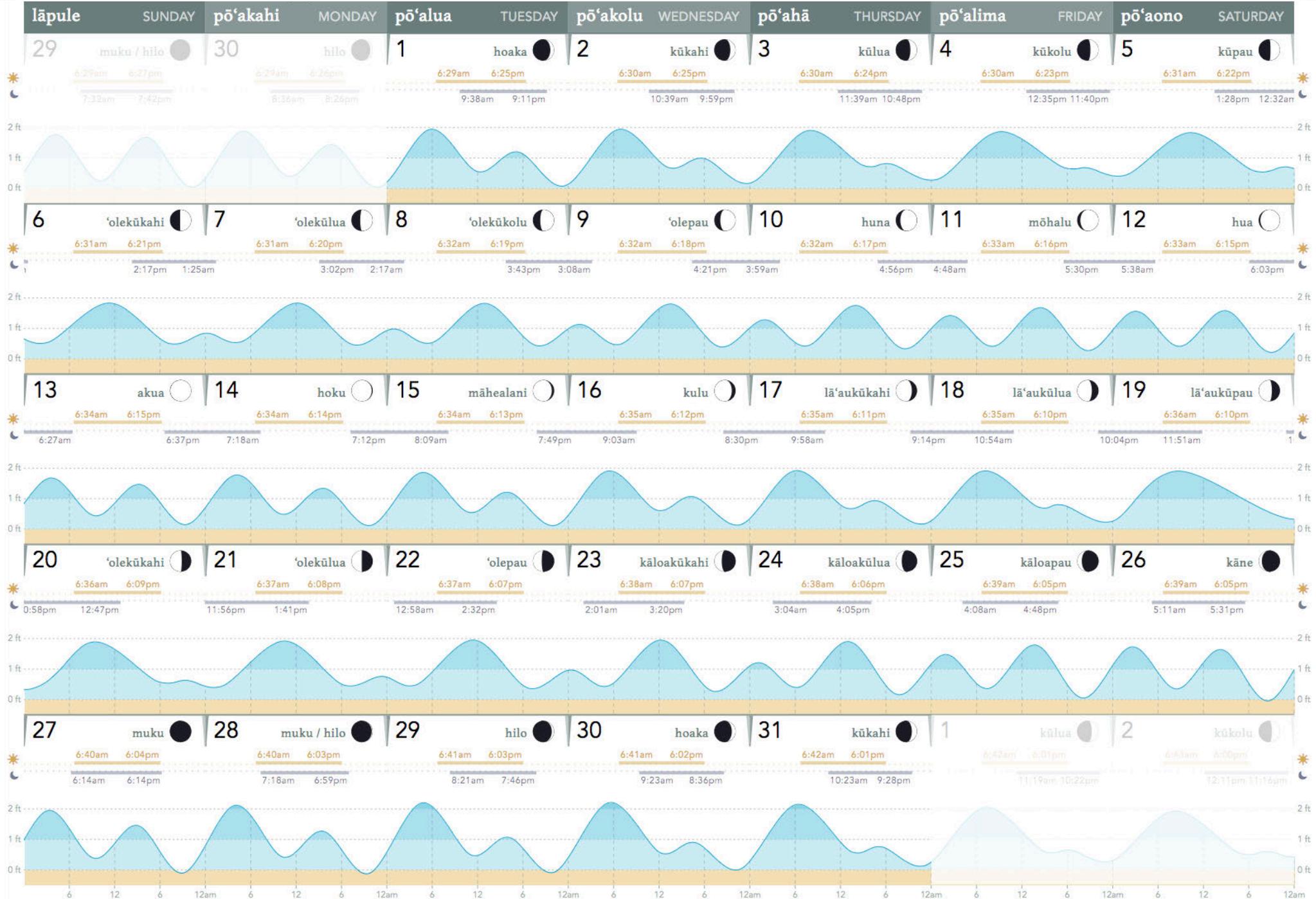
OCTOBER	Āholehole	Manini	‘Ōmilu	‘Ōpelu	Akule	Halalū	Moi	Ula	Ula Pāpapa	Kona Crab	‘Ama‘ama
	—	—	—	—	!			—	—	—	—
					LIMITED HARVEST State restrictions apply	LIMITED HARVEST 15/day 11 in. minimum fork length					

For more info see the full FISHING SEASON TABLE near the start of the calendar

# 'okakopa

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# OCTOBER



# Harvest wisely to ensure future catches!

Know your fish before you harvest. *Moi: male or female?*

**Young moi** are all males which eventually turn into females when they reach about 13 inches (fork length).



**Pālāmoi** are transforming from male to female, having both eggs and sperm.



**Releasing very large moi** helps to ensure females will survive to spawn successfully.



NOVEMBER

Āholehole

Manini

‘Ōmilu

‘Ōpelu

Akule

Halalū

Moi

Ula

Ula Pāpapa

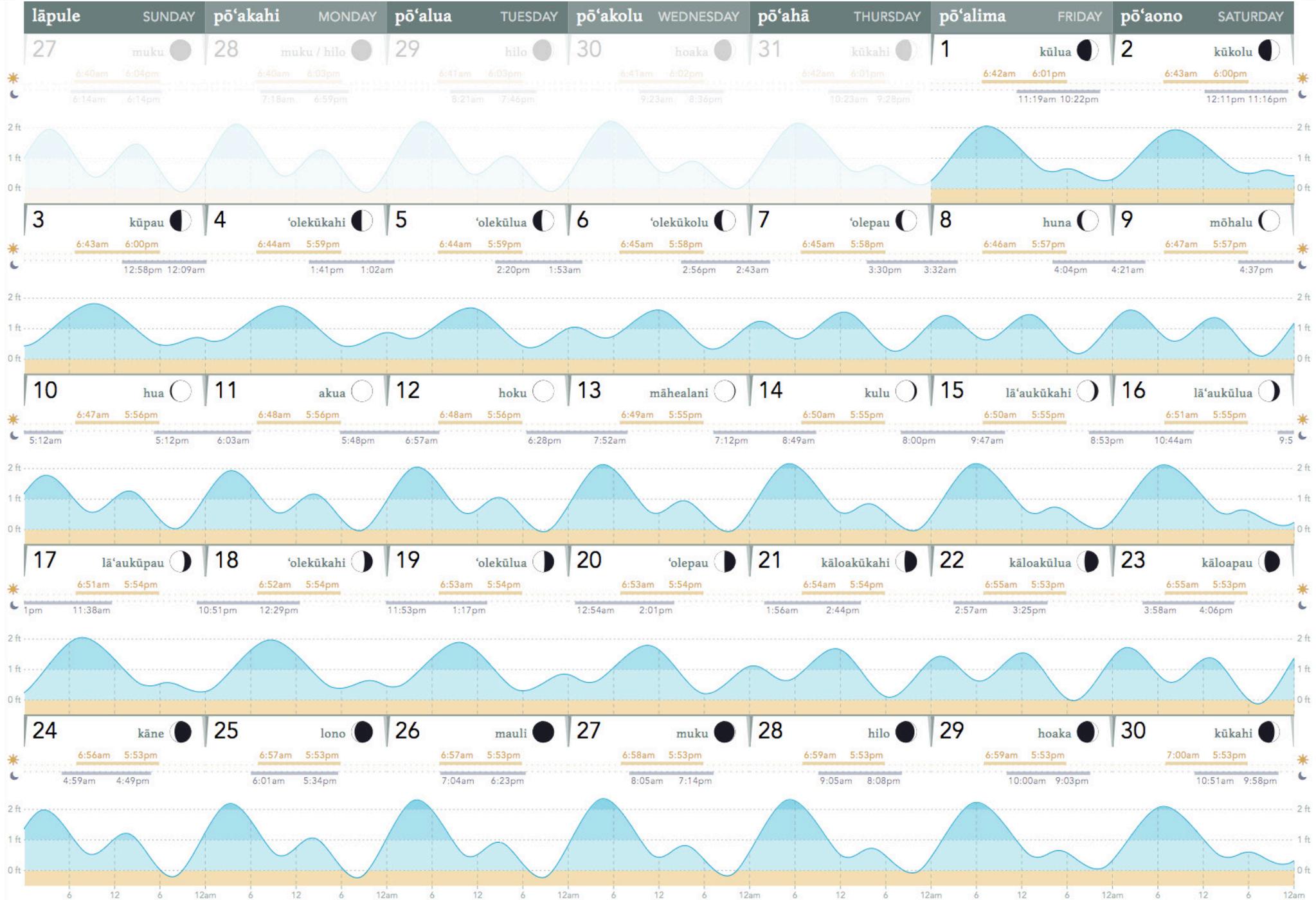
Kona Crab

‘Ama‘ama

For more info see the full FISHING SEASON TABLE near the start of the calendar



LIMITED HARVEST  
15/day 11 in. minimum fork length



# Harvest wisely to ensure future catches!

## Observations on He'e

Reproduction of he'e in Hawai'i is still not thoroughly understood. However, it's known that they are able to reproduce year-round, females often dying shortly after eggs have hatched (approximately 12-15 months of age). The eggs are carefully tended to in a den of the female who guards them 24 hours a day. She won't eat during this time, approximately 20-36 days, as leaving them unattended might allow small fish and crustaceans a chance to eat them.

The he'e populations today are reported to be only a fraction of what they were in the recent past. Kūpuna tell stories of when he'e were much more abundant and easily found on reef flats at low tide. Harvesting of he'e was a community event in which men, women, and children would participate. There were also seasonal restrictions on when he'e were open to harvest.

## HARVEST PONO

Harvesting only 1 or 2 he'e per outing may help to prevent populations from being over-fished. Perhaps harvesting he'e by hand (not spearing) will allow females to be released if eggs are seen in the den.

DECEMBER

Āholehole

Manini

‘Ōmilu

‘Ōpelu

Akule

Halalū

Moi

Ula

Ula Pāpapa

Kona Crab

‘Ama‘ama

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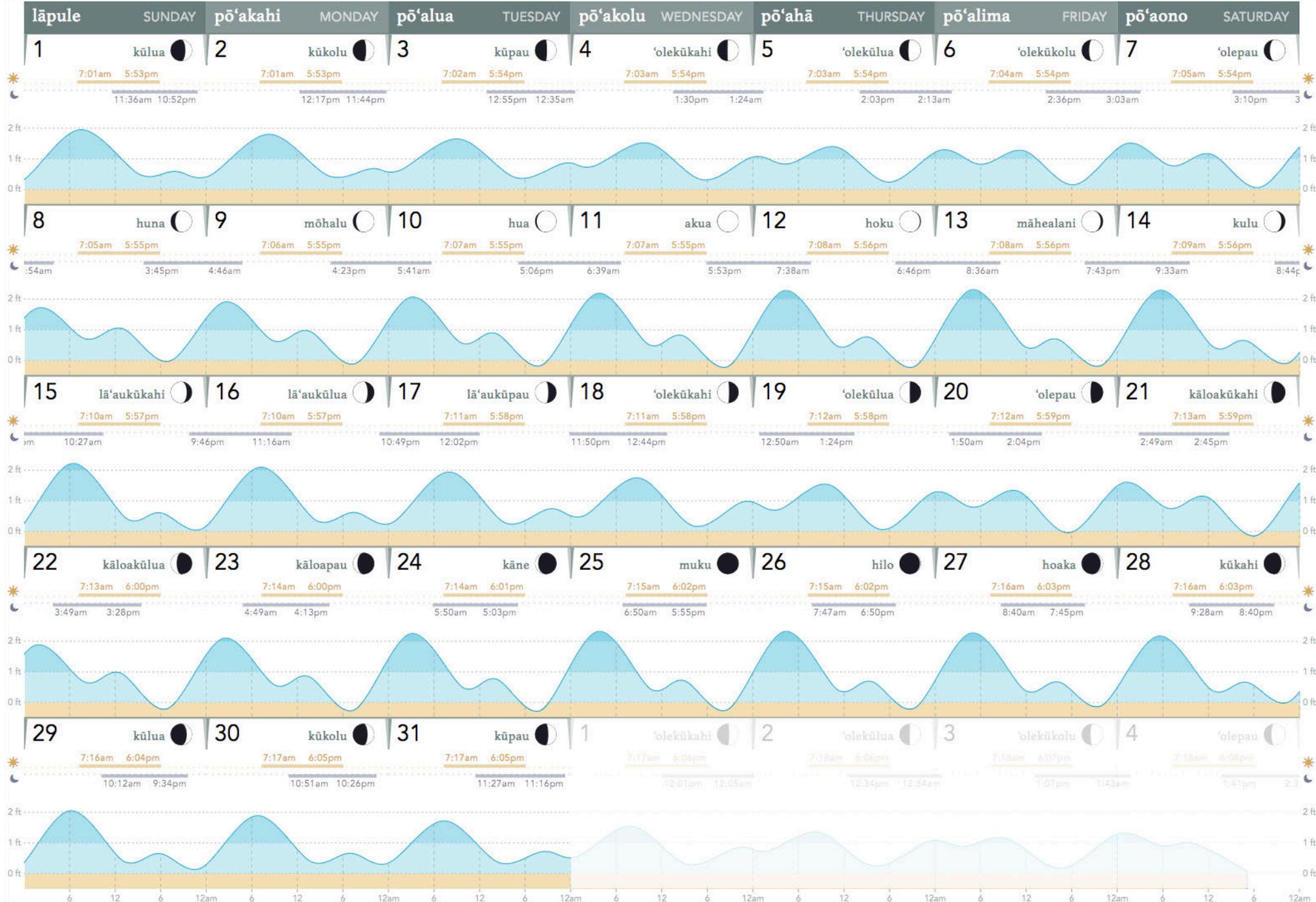


LIMITED HARVEST  
15/day 11 in. minimum fork length

# kēkēmapa

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# DECEMBER



If you are interested in learning how you can contribute to this and other projects in Hanalei, please contact the Hanalei Watershed Hui at: **(808) 826-1985** or [Hanaleiwatershedhui@gmail.com](mailto:Hanaleiwatershedhui@gmail.com)

The Hanalei Moon and Tide Calendar was made possible through the following partnerships:

Hanalei Watershed Hui

Papahānaumokuākea Marine National Monument

Hawaiian Islands Humpback Whale National Marine Sanctuary

State of Hawai'i Department of Land and Natural Resources  
Division of Aquatic Resources

Waipā Foundation

U.S. Fish and Wildlife Service

Dr. Alan Friedlander, University of Hawai'i at Mānoa

**HanaleiWatershedHui**



  
PAPAHĀNAUMOKUĀKEA  
Marine National Monument

**WAIPĀ**



HAWAIIAN ISLANDS HUMPBACK WHALE  
NATIONAL MARINE SANCTUARY

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