BASIS survey: catch by species and life history stage with 0s

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## Subject

The basis\_catch web service provides BASIS survey catch level information by species, and life history stage from the AKFIN database

## Background

This query was designed so EMA scientists could easily share BASIS data without needing logins, VPN connections, etc.

Something about BASIS…

## Data Sources

This web service queries the basisfish\_event, basisfish\_catch, basisfish\_lifehistorystage, basisfish\_trawlgear, and basisfish\_trawl\_performance tables in the EMA schema. Data includes catches of zero. See below for query logic. Look up optional TSN filter through ‘<https://apex.psmfc.org/akfin/data_marts/akmp/basis_tsn>’

## Data Access URL

**Base URL:** <https://apex.psmfc.org/akfin/data_marts/akmp/basis_catch_spp_lh_0>

**Parameters**

| **Parameter** | **Description** | **Requirement** | **Values** |
| --- | --- | --- | --- |
| startyear | Specify start year | Optional | 1996 to present |
| endyear | Specify end year | Optional | 1996 to present |
| minlat | Minimum latitude | Optional | 38-73 |
| maxlat | Maximum latitude | Optional | 38-73 |
| tsn | Taxonomic Serial Number: https://apex.psmfc.org/akfin/data\_marts/akmp/basis\_tsn | Optional | 1602 distinct species as of Jan 2022 |

**Example URLs:**

* Retrieve data for 2004 only: <https://apex.psmfc.org/akfin/data_marts/akmp/basis_catch_spp_lh_0?startyear=2004&endyear=2004>
* Retrieve data from 2004 above 60 degrees North: <https://apex.psmfc.org/akfin/data_marts/akmp/basis_catch_spp_lh_0?startyear=2004&endyear=2004&minlat=60>
* Retrieve Pacific cod data from 2004 South of 60 degrees North: <https://apex.psmfc.org/akfin/data_marts/akmp/basis_catch_spp_lh_0?startyear=2004&endyear=2004&maxlat=60&tsn=164711>
* Retrieve Pacific cod and pollock data from 2004 South of 60 degrees North: <https://apex.psmfc.org/akfin/data_marts/akmp/basis_catch_spp_lh_0?startyear=2004&endyear=2004&maxlat=60&tsn=164711,934083>

## Data Download (R)

The full dataset is >300,000 records and downloading it may take several minutes.

#install packages if not already downloaded  
library(httr) #for accessing web services  
library(tidyverse) #for converting data into exportable data frame  
  
#full data download: This will take several minutes  
#Modify this url as desired for a custom data query.  
data<-httr::content(  
 httr::GET('https://apex.psmfc.org/akfin/data\_marts/akmp/basis\_catch\_spp\_lh\_0'),   
 type = "application/json") %>%   
 bind\_rows  
  
#Lookup Pacific cod tsn  
httr::content(  
 httr::GET('https://apex.psmfc.org/akfin/data\_marts/akmp/basis\_tsn'),   
 type = "application/json") %>%   
 bind\_rows%>%  
 filter(COMMONNAME=="Pacific Cod")

## Field descriptions

| **Parameter** | **Description** |
| --- | --- |
| STATIONID | Unique Station Identifier: Concatenation of Year(4) VesselCode(2), CruiseNumber(2), and StationNumber(3) |
| EVENTCODE | Code indicating order of events (begins at 03 for trawls) |
| SAMPLEYEAR | Year in which sampling occured. |
| GEARCODE | Code for gear used in trawl. See TrawlGear Table. |
| TRAWLPERFORMANCE\_CODE | Code indicating performance of trawl. See TrawlPerformance table. |
| EQ\_LATITUDE | Latitude at which gear reached equilibrium and is considered fishing (Surface/MidWater) or time at which gear reached max depth and began retrieval (oblique) |
| EQ\_LONGITUDE | Longitude at which gear reached equilibrium and is considered fishing (Surface/MidWater) or time at which gear reached max depth and began retrieval (oblique) |
| HAVERSINEDISTANCE2 | Great circle distance between two points, trawl start and end? |
| AVGNETHORIZONTALOPENING | Average net width |
| EFFORT\_AREA\_KM2 | Effort area in square km. The product of haversinedistance2 and avgnethorizontaldistance2 divided by 1000 |
| TSN | Taxonomic serial number |
| SPECIESNAME | Species common name |
| LHSCODE | Two to four character code representing the life history stage of the fish (see Life History Stage table for allowable values). |
| GEAR\_DESCRIPTION | Description of the gear type. |
| TRAWLPERFORMANCE | Description of TRAWLPERFORMANCE\_Code |
| LIFEHISTORY\_STAGE | Description of LHSCODE |
| TOTALCATCHNUM | Counted or calculated total catch of the species/maturity in the trawl |
| TOTALCATCHWT | Counted or calculated total weight (grams) of the species/maturity in the trawl. |

## Source code

Below is the sql code used in the web service.

WITH speccatch  
 AS ( SELECT Event.StationID,  
 Event.EventCode,  
 Event.SampleYear,  
 Event.GearCode,  
 Event.TrawlPERformance,  
 Event.EQ\_LATITUDE,  
 Event.EQ\_LONGITUDE,  
 EVENTEFFORT.HaversineDistance2,  
 EVENTEFFORT.AvgNetHorizontalOpening,  
 EVENTEFFORT.Effort\_area\_km2,  
 to\_char(species.tsn) as tsn,  
 species.commonname,  
 UPPER (catch.lhscode) AS lhscode,  
 SUM (catch.totalcatchnum) AS totalcatchnum,  
 SUM (catch.totalcatchwt) AS totalcatchwt  
 FROM ema.BASISFISH\_Event EVENT  
 INNER JOIN ema.BASISFISH\_EVENTEFFORT EVENTEFFORT  
 ON (Event.EventCode = EVENTEFFORT.EventCode)  
 AND (Event.StationID = EVENTEFFORT.StationID)  
 INNER JOIN EMA.BASISFISH\_CATCH CATCH  
 ON (Event.EventCode = Catch.EventCode)  
 AND (Event.StationID = Catch.StationID)  
 INNER JOIN EMA.BASISFISH\_SPECIES SPECIES  
 ON Species.TSN = Catch.SpeciesTSN  
 WHERE ( ( (Event.SampleYear) >= 2002)  
 AND ( NOT (Event.TrawlPERformance) = 'A'  
 OR (Event.TrawlPERformance) = 'U')--AND ( (Event.EQ\_LATITUDE) BETWEEN 60 AND 66.5));  
 /\*replace with bind variable\*/  
 /\*AND ( (Event.EQ\_LATITUDE) BETWEEN :minlat AND :maxlat)\*/  
 )  
 GROUP BY Event.StationID,  
 Event.EventCode,  
 Event.SampleYear,  
 Event.GearCode,  
 Event.TrawlPERformance,  
 Event.EQ\_LATITUDE,  
 Event.EQ\_LONGITUDE,  
 EVENTEFFORT.HaversineDistance2,  
 EVENTEFFORT.AvgNetHorizontalOpening,  
 EVENTEFFORT.Effort\_area\_km2,  
 species.commonname,  
 species.tsn,  
 catch.lhscode),  
 cjoin  
 AS (SELECT e.\*, s.\*  
 FROM (SELECT DISTINCT  
 stationid,  
 eventcode,  
 sampleyear,  
 gearcode,  
 trawlperformance AS trawlperformance\_code,  
 eq\_latitude,  
 eq\_longitude,  
 haversinedistance2,  
 avgnethorizontalopening,  
 effort\_area\_km2  
 FROM speccatch) e  
 CROSS JOIN  
 (SELECT DISTINCT  
 tsn,  
 commonname AS speciesname,  
 UPPER (lhscode) AS lhscode  
 FROM speccatch) s)  
SELECT cj.\*,  
 tg.description AS gear\_description,  
 tp.trawlperformance,  
 lhs.description AS lifehistory\_stage,  
 NVL (sc.totalcatchnum, 0) AS totalcatchnum,  
 NVL (sc.totalcatchwt, 0) AS totalcatchwt  
 FROM cjoin cj  
 LEFT JOIN speccatch sc  
 ON cj.stationid = sc.stationid  
 AND cj.eventcode = sc.eventcode  
 AND cj.tsn = sc.tsn  
 AND cj.lhscode = sc.lhscode  
 LEFT JOIN ema.basisfish\_lifehistorystage lhs  
 ON cj.lhscode = lhs.code  
 LEFT JOIN ema.basisfish\_trawlperformance tp  
 ON cj.trawlperformance\_code = tp.trawlperformancecode  
 LEFT JOIN ema.basisfish\_trawlgear tg  
 ON cj.gearcode = tg.code  
 where cj.sampleyear between nvl(:startyear, 2000)and nvl(:endyear, 3000) and  
 cj.tsn in (select \* from table(apex\_string.split(nvl(:tsn, cj.tsn),','))) and  
 cj.eq\_latitude between nvl(:minlat, 0)and nvl(:maxlat, 90);