Rocky Mountain Biological Laboratory (RMBL)

Marmot Database Metadata

This document describes all data included in our long-term database for the yellow-bellied marmot study at the Rocky Mountain Biological Laboratory (RMBL). The database is a relational database in the program Base which is part of Libre Office. While the companion document (*Rocky Mountain Biological Laboratory (RMBL) Marmot Trapping Guide, Protocols, and Data Management Plan*) explains how data are collected and recorded, this document refers specifically to the data stored in all database tables. The first table included below describes all tables included in the marmot database, followed by a more detailed description of each table.

Data are freely available upon request
(email Dr. Daniel Blumstein @ marmots@ucla.edu)

The database includes the following tables (updated to include data from 2014 field season):

Database Table Name	Description	Years	Number of Records
tb_annualid	Annual information on birth, death, reproduction, etc. for each individual in each colony	current year only	
tb_blood	Information on blood samples collected during trapping events	2002-2014	3349
tb_bloodfreezer	List of blood samples stored in freezer at UCLA	2002-2014	2974
tb_colony	Information on all colony locations	n/a	55
tb_cort	Information on fecal corticosteroid metabolite concentrations extracted from fecal samples	2002-2014	2372
tb_fecalparasite	Information on fecal parasites found in collected fecal samples	2003-2008	905
tb_fid	Results from flight initiation distance (FID) experiments	2003-2014	965
tb_focal	Results from 2-minute foraging focals	2002-2014	2750
tb_genetic	genotypes of individuals for which DNA is available	2001 - 2014	1599
tb_id	Information on birth, death, location, parents, etc. for each individual	1962-2014	3884
tb_obs	Observations of locations and non-interaction behaviors during behavioral observation periods	2002-2014	75895
tb_predobs	Observations of predators during and outside behavioral observation periods	2002-2014	1700
tb_runspeed	Results from running speed experiments	2002-2014	757

tb_socint	Observations of social interactions during behavioral observation periods	2002-2014	46830
tb_taglookup	Original and current animal identification information	1962-2014	4679
tb_timeobs	Records of all behavioral observation periods	2002-2014	7998
tb_trap	Information collected at each trapping event	1965-2014	20794
tb_weatheryearly	Weather data collected for each year by billy barr at the RMBL weather station	1975-2013	39

We will now describe the data included (by column) in each database table below

Tb_annualid:

Column	Description
year.uid	Combined year and uid (see below)
uid	Left and right ear tags separated by _ (LT_RT) given when first trapped
year	calendar year
survival	0 = did not survive through the following winter, 1 = survived through the following winter
col_area	Geographic area where individual lives
rs	reproductive status observed based on behavioral observations and parentage analysis
nboffspring	Number of offspring produced
dispersal	Estimated, for yearlings, based on behavioral observations
mortality.type	Cause of death, if known
massjun	mass estimated on 01 June
massaug	mass estimated on 15 August
nbmassdata	number of mass observations used for estimation

Tb_blood

Column	Description
date.time.uid	combined date, time and individual identity in the format MMDDYYYY.HHMM.LT_RT
t.before.arr	Time marmot was in trap before observers arrived if known in decimal format
t.at.trap	Time at which observers arrived at trap in decimal format
t.in.bag	Time at which marmot entered the bag in decimal format
t.blood	Time at which blood was collected in decimal format
v.blood	Amount of blood extracted from marmot in ml
v.plasma	Amount of plasma collected from extracted blood in ml

v.cell	Amount of cells collected from extracted blood in ml
v.rna	Amount of RNA sample collected from extracted blood in ml
neutrophils	Number of this type of cell counted
lymphocytes	Number of this type of cell counted
eosinophils	Number of this type of cell counted
monocytes	Number of this type of cell counted
basophils	Number of this type of cell counted
trypanosomes	Presence or absence of trypanosomes on the slide
useful.smear	Was blood smear useful for scoring process? Y = yes, N = no
comments	Detailed notes about blood collection / samples
person	name of the person who counted the blood smears
id	numeric id of blood sample

Tb_bloodfreezer

Column	Description
ID	sample ID
date.time.uid	combined date, time and individual identity in the format MMDDYYYY.HHMM.LT_RT
box	Labelled box number in which sample is stored in freezer
y	Labelled column number in which sample is stored in box
x	Labelled row number in which sample is stored in box
plasma	Volume of plasma sample in ml
cells	Volume of cells sample in ml
curid	Combined numbers separated by "_" of the current L and R ear tags
new_date	date of sample collection
notes	Detailed notes about blood samples

Tb_colony

Column	Description
col_area	Geographic area where individual lives
colony	colony
valley	uv = up valley, dv = down valley
main	main colony? Checkmark = yes, no checkmark = no
loc8	grouping of colonies used in previous analysis
loc5	grouping of colonies used in previous analysis

Tb_cort

Column	Description
date.time.uid	combined date, time and individual identity in the format MMDDYYYY.HHMM.LT_RT
sample	Unique identification number for this sample
per_CV	Proportion of coefficient of variation
per_bound	Proportion of sample bound to radioisotopes
cort_ngL	Cort measured in ng/L
cort_ngg	Cort measured in ng/g
cortlab	lab of cort analysis
assay_nb	sample number
person	Person that prepared and sent samples for analysis

Tb_fecalparasite

Column	Description
date.time.uid	combined date, time and individual identity in the format MMDDYYYY.HHMM.LT_RT
ascaris	0 = parasite absent, 1 = parasite present
eimeria	0 = parasite absent, 1 = parasite present
entamoeba	0 = parasite absent, 1 = parasite present
morph_B	0 = parasite absent, 1 = parasite present
morph_C	0 = parasite absent, 1 = parasite present
morph_E	0 = parasite absent, 1 = parasite present
morph_F	0 = parasite absent, 1 = parasite present
other	0 = parasite absent, 1 = parasite present
comments	Detailed notes about fecal parasites

Tb_fid

Column	Description
date.time.uid	combined date, time and individual identity in the format MMDDYYYY.HHMM.LT_RT
uid	Left and right ear tags separated by _ (LT_RT) given when first trapped
year	Calendar year in which data was collected
date	date written DD-MMM-YYYY
jdate	numerical date estimated from January 1
time	Time FID was conducted using decimal 24 hour clock
observer	Name of person conducting FID on marmot
col_area	Geographic area where individual lives

location	Distinct locations of burrows or areas within colony sites
init_behav	Initial behavior of marmot prior to the experiment
n_win_10	Number of other marmots within 10 meters of marmot
dist_start	Starting distance: the distance from the marmot to the person at the start of the FID (in meters)
dist_alert	Alert distance: the distance from the marmot to the person when the marmot oriented its head to the person (in meters)
1esc	Method of first escape: run, walk, out of sight
2esc	Method of second escape: run, walk, out of sight
1fid	Flight initiation distance (FID) of first escape: The distance from the marmot to the person when it moved (in meters)
2fid	Flight initiation distance (FID) of second escape: The distance from the marmot to the person when it moved (in meters)
slope_ini	Slope of marmot's initial position: What was the incline where the marmot was to its terrain before it fleas?
slope_esc	Marmot escape incline (only if moved, if not, no entry): If the marmot ran away, what was the incline that it ran over?
ini_subst	Initial substrate when experiment starts: LV = low vegetation (marmot in open area), HV = high veg (marmot covered by vegetation), D = dirt, S = stones, T = talus)
esc_subst	Substrate during escape: LV = low vegetation (marmot in open area), HV = high veg (marmot covered by vegetation), D = dirt, S = stones, T = talus)
bur_dist_fid	Distance from the burrow at flight initiation distance
comments	Detailed notes about FID

Tb_focal

Column	Description
date.time.uid	combined date, time and individual identity in the format MMDDYYYY.HHMM.LT_RT
uid	Left and right ear tags separated by _ (LT_RT) given when first trapped
year	Calendar year in which data was collected
date	Date focal was conducted (format: Day-Month-Year, e.g., 13-Jun-01)
jdate	Date written as consecutive numerical value (e.g., Jan-31 = 31, Feb-01 = 32)
time	Time focal began using 24-hour clock (e.g., 17:42)
obs	Name of person conducting focal on marmot
col_area	Geographic area where individual lives
location	Distinct locations of burrows or areas within colony sites
nb_sfg	Number of times this behavior occurred during the focal observation (sfg = stand forage)
nb_rfg	Number of times this behavior occurred during the focal observation (rfg = rear forage)
nb_slook	Number of times this behavior occurred during the focal observation (slook = stand look)
nb_run	Number of times this behavior occurred during the focal observation

nb_oos	Number of times this behavior occurred during the focal observation (oos = out of sight)
nb_rlook	Number of times this behavior occurred during the focal observation (rlook = rear look)
nb_other	Number of times this behavior occurred during the focal observation
nb_walk	Number of times this behavior occurred during the focal observation
tottime_sfg	Total time in milleseconds (ms) allocated by marmot to this behavior (sfg = stand forage)
tottime_rfg	Total time in milleseconds (ms) allocated by marmot to this behavior (rfg = rear forage)
tottime_slook	Total time in milleseconds (ms) allocated by marmot to this behavior (slook = stand look)
tottime_run	Total time in milleseconds (ms) allocated by marmot to this behavior
tottime_oos	Total time in milleseconds (ms) allocated by marmot to this behavior (oos = out of sight)
tottime_rlook	Total time in milleseconds (ms) allocated by marmot to this behavior (rlook = rear look)
tottime_other	Total time in milleseconds (ms) allocated by marmot to this behavior
tottime_walk	Total time in milleseconds (ms) allocated by marmot to this behavior
meanbout_sfg	Mean bout length of behavior in milleseconds (ms) (sfg = stand forage)
meanbout_rfg	Mean bout length of behavior in milleseconds (ms) (rfg = rear forage)
meanbout_slook	Mean bout length of behavior in milleseconds (ms) (slook = stand look)
meanbout_run	Mean bout length of behavior in milleseconds (ms)
meanbout_oos	Mean bout length of behavior in milleseconds (ms) (oos = out of sight)
meanbout_rlook	Mean bout length of behavior in milleseconds (ms) (rlook = rear look)
meanbout_other	Mean bout length of behavior in milleseconds (ms)
meanbout_walk	Mean bout length of behavior in milleseconds (ms)
prop_sfg	Proportion of time when the marmot was in sight that it allocated to this behavior (sfg = stand forage)
prop_rfg	Proportion of time when the marmot was in sight that it allocated to this behavior (rfg = rear forage)
prop_slook	Proportion of time when the marmot was in sight that it allocated to this behavior (slook = stand look)
prop_run	Proportion of time when the marmot was in sight that it allocated to this behavior
prop_oos	Proportion of total time when the marmot was out of sight
prop_rlook	Proportion of time when the marmot was in sight that it allocated to this behavior (rlook = rear look)
prop_other	Proportion of time when the marmot was in sight that it allocated to this behavior
prop_walk	Proportion of time when the marmot was in sight that it allocated to this behavior

nwin10	Number of marmots within 10 meters or less of the focal marmot
nwin50	Number of marmots within 50 meters or less of the focal marmot
angle	Slope of marmot's position to the vegetation (1 = 0-10°, 2 = 10-30°, 3 > 30°)
substrate	Substrate encountered focal animal survey: LV = low vegetation (marmot in open area), HV = high veg (marmot covered by vegetation), D = dirt, S = stones, T = talus)
dist_burr	Distance from focal marmot to closest burrow (in meters)
njuv10	Number of juveniles within 10 meters or less of the focal marmot
nyearl10	Number of yearlings within 10 meters or less of the focal marmot
nadsasex10	Number of marmots of the same sex within 10 meters or less of the focal marmot
nadopsex10	Number of marmots of the opposite sex within 10 meters or less of the focal marmot
njuv50	Number of juveniles within 50 meters or less of the focal marmot
nyearl50	Number of yearlings within 50 meters or less of the focal marmot
nadsasex50	Number of marmots of the same sex within 50 meters or less of the focal marmot
nadopsex50	Number of marmots of the opposite sex within 50 meters or less of the focal marmot
comments	Detailed notes about focal
resfile	name of Jwatcher files containing raw data

Tb_genetic

Column	Description
pk	table record number
uid	Left and right ear tags separated by _ (LT_RT) given when first trapped
2G2	allele numbers (separated by "_") for this locus, obtained from hair DNA extractions
BIB18	allele numbers (separated by "_") for this locus, obtained from hair DNA extractions
BIB31	allele numbers (separated by "_") for this locus, obtained from hair DNA extractions
BIB4	allele numbers (separated by "_") for this locus, obtained from hair DNA extractions
GS22	allele numbers (separated by "_") for this locus, obtained from hair DNA extractions
IGS6	allele numbers (separated by "_") for this locus, obtained from hair DNA extractions
MA018	allele numbers (separated by "_") for this locus, obtained from hair DNA extractions
MA091	allele numbers (separated by "_") for this locus, obtained from hair DNA extractions
MS47	allele numbers (separated by "_") for this locus, obtained from hair DNA extractions
SGS14	allele numbers (separated by "_") for this locus, obtained from hair DNA extractions

SGS25	allele numbers (separated by "_") for this locus, obtained from hair DNA extractions
ST10	allele numbers (separated by "_") for this locus, obtained from hair DNA extractions
duplicate	is the line a duplicate genotype
olduid	temporary id of individual which lost both tags and was recognize using genotype matching

Tb_id

Column	Description
uid	Left and right ear tags separated by _ (LT_RT) given when first trapped
sex	M (male), F (female), or U (unknown)
yr1seen	First calendar year in which marmot was seen
yrborn	Calendar year in which marmot was born
ageclassfs	Age class when first seen: A = adult, Y = yearling, J = juvenile
col_area	Geographic area where individual lives
dam	uid of marmot's mother (confirmed by genetic data)
sire	uid of marmot's father (confirmed by genetic data)
method	method of parentage assignment
dam_colony	Geographic area where dam lives
sire_colony	Geographic area where sire lives
dammixed	id of females if multiple potential dams
pup_emerjdate	Date that first pup in litter emerged (format: numerical value - e.g., 196)
pup_emergencedate	Date that first pup in litter emerged (format: DD-Mon-YYYY - e.g., 15-Jul-2011)
yr_1reproseen	First calendar year that marmot reproduced
yr_death	Calendar year in which marmot died
littersizeborn	Total number of emerged pups in litter

Tb_obs

Column	Description
pk	table record number
observer	Name of person collecting behavioral data on marmots
year	Calendar year in which data was collected
date	Date observation was conducted (format: Day-Month-Year, e.g., 13-Jun-2001)
jdate	Date written as consecutive numerical value from January 1
time	Time of observation using 24-hour clock in decimal format
uid	Left and right ear tags separated by _ (LT_RT) given when first trapped

col_area	Geographic area where individual lives
location	Distinct locations of burrows or areas within colony sites
cheek rub	No = 0 or Yes = 1
tail flag	No = 0 or Yes = 1
CDP	No = 0 or Yes = 1 (CDP = carrying dry plants)
comments	Detailed notes about observation event

Tb_predobs

Column	Description
pk	table record number
observer	Name of person collecting data on predator observation
year	Calendar year in which data was collected
date	Date observation was conducted (format: Day-Month-Year, e.g., 13-Jun-01)
jdate	Date written as consecutive numerical value (e.g., Jan-31 = 31, Feb-01 = 32)
time	Time of observation using 24-hour clock in decimal format
species	Name of predator species observed
nbseen	Number of predators seen
col_area	Geographic area where individual lives
location_comments	Detailed notes about location of predator(s)
duringobs	During observation period? No = 0 or Yes = 1
comments	Detailed notes about observation event

Tb_runspeed

Column	Description
date.time.uid	combined date, time and individual identity in the format MMDDYYYY.HHMM.LT_RT
time	Time running trial occurred using 24-hour clock in decimal format
timer	Person timing run trial
dist	Distance marmot run in meters
runtime	Time length of recorded run in seconds
distburrow	Distance from where run started to burrow in meters
incline	Incline of location of run
substrate	Substrate of location of run: LV = low vegetation (marmot in open area), HV = high veg (marmot covered by vegetation), D = dirt, S = stones, T = talus)
toburrow	Did marmot run to burrow? 0 = no, 1 = yes, straight run, 2 = yes, curved run
comments	Detailed notes about running trial

Tb_socint

Column	Description
pk	table record number
year	Calendar year in which data was collected
date	Date observation was conducted (format: Day-Month-Year, e.g., 13-Jun-01)
jdate	Date written as consecutive numerical value (e.g., Jan-31 = 31, Feb-01 = 32)
time	Time of observation using 24-hour clock in decimal format
col_area	Geographic area where individual lives
location	Distinct locations of burrows or areas within colony sites
uid_ini	Left and right ear tags separated by _ (LT_RT) given when first trapped for the marmot that initiated the interaction
uid_rec	Left and right ear tags separated by _ (LT_RT) given when first trapped for the marmot that received the interaction
uid_win	Left and right ear tags separated by _ (LT_RT) given when first trapped for the marmot that won (stayed) the interaction
interac_type	Nature of social interaction (e.g., allogrooming, play)
nb_indiv	Number of individuals involved in interaction
obs	Name of person collecting behavioral data on marmots
comments	Detailed notes about observation event

Tb_taglookup

Column	Description
curid	Left and right ear tags separated by _ (LT_RT) when tags are changed/lost/ripped
uid	Left and right ear tags separated by _ (LT_RT) given when first trapped
year	Calendar year in which tags were changed
comments	Details notes about individual's ear tags / identification

Tb_timeobs

Column	Description
pk	table record number
year	Calendar year in which data was collected
date	Date observations were conducted (format: Day-Month-Year, e.g., 13-Jun-01)
jdate	Date written as consecutive numerical value (e.g., Jan-31 = 31, Feb-01 = 32)
start_time	Time at which observer started an observation session using 24-hour clock in decimal format

end_time	Time at which observer ended an observation session using 24-hour clock in decimal format
tot_time	Total amount of time during an observation period (in minutes)
col_area	Geographic area observed
observer	Name of person collecting behavioral data on marmots
weather	Description of weather during observation period
comments	Detailed notes about observation period

Tb_trap

Column	Description
date.time.uid	combined date, time and individual identity in the format MMDDYYYY.HHMM.LT_RT
year	Calendar year in which data was collected
date	Date marmot was trapped (format: Day-Month-Year, e.g., 13-Jun-2001)
jdate	Date written as consecutive numerical value (e.g., Jan-31 = 31, Feb-01 = 32)
time	Time marmot was trapped using 24-hour clock in decimal format
uid	Left and right ear tags separated by _ (LT_RT) given when first trapped
col_area	Geographic area where individual lives
location	Distinct locations of burrows or areas within colony sites
mass	Weight of marmot at time of capture in grams after subtracting the mass of the empty handling bag
agd	Length from middle of anus to middle of genitals in mm
lhf	Left hind foot length in mm
tail	Length of tail in mm
rs	Reproductive status: 1 = testes scrotal, 2 = testes unknown, 3 = nipples visible, 4 = nipples prominent, 5 = nipples swollen, 6 = lactating, 0 = no nipples seen
hipbodyfat	hip measurement of fat (taken ust above iliac crest of hip using calliper)
hambodyfat	ham measurement of fat (taken on thigh using calliper)
defecated	0 = no defecation, 1 = marmot defecated in trap, 2 = marmot defecated in bag, 3 = marmot defecated in trap and in bag
tooth	0 = no tooth chatter (teeth clicking) in trap, 1 = marmot tooth chattered in trap
called	0 = no alarm call in trap, 1 = marmot alarm called in trap
struggled	0 = no struggling in trap, 1 = marmot struggling or banging itself against the trap
bite	0 = no biting cage, 1 = marmot biting cage
walk_bag	0 = marmot did not walk immediately into the bag, 1 = marmot walked into handling bag more-or-less immediately
sp_blood	blood sample collected? 0 = no, 1 = yes
sp_fecal	fecal sample collected? 0 = no, 1 = yes
sp_hair	hair sample collected? 0 = no, 1 = yes

sp_audio	audio recording collected? 0 = no, 1 = yes
sp_run	running trial conducted? 0 = no, 1 = yes
sp_olfac	olfactory samples (oral angle, orbital, anal) collected? 0 = no, 1 = yes
sp_rna	RNA sample collected? 0 = no, 1 = yes
sp_fleas	flea sample collected? 0 = no, 1 = yes
sp	combined initials of samples taken
comments	Detailed notes about trapping event

Tb_weatheryearly

Column	Description
year	Calendar year in which data was collected
springT	mean spring temperature
summerP	mean summer precipitation
winterT	mean winter temperature
aprS	Snow on the ground on April 1
mayS	Snow on the ground on May 1
maxS	Max snow on the ground during the winter
totS	Total snowfall
snowmelt	date of snowmelt
winterlg	length of winter
summerlg	length of summer
plantgrow	length of growing season
endvi	early normalized difference vegetation index from satellite images from GIMMS (Global Inventory Modelling and Mapping Studies: http://glcf.umd.edu/data/gimms/)
pndvi	peak normalized difference vegetation index from satellite images from GIMMS (Global Inventory Modelling and Mapping Studies: http://glcf.umd.edu/data/gimms/)
lndvi	late normalized difference vegetation index from satellite images from GIMMS (Global Inventory Modelling and Mapping Studies: http://glcf.umd.edu/data/gimms/)
emergence	date of first marmot seen in town