Analysis: carbon storage

in Bieszczady, Poloniny, and Uzhanski NPs

Sviataslau Valasiuk

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Executive Summary

The report developed under the project “Data Based Advocacy for Sustainable Management of the East Carpathians Biosphere Reserve” comprises the results and conclusions of the valuation exercise of the carbon storage ecosystem service provided by the protected mountain forests of the International Biosphere Reserve “East Carpathians”. Obtained on the basis of global above-ground biomass dataset provided by the European Space Agency and global voluntary carbon market quotations, the monetary valuation results fall into the range between 314 and 2,781 thousand USD per annum (corresponding to 1.5 to 13.3 USD per annum per hectare) which – accounting for certain spatial heterogeneity – represents a valuable element of local ecosystem services. The discussion of the obtained results in term of their robustness, precision, and practicality have highlighted some mixed evidence and other potential issues. Nevertheless, the obtained results could be used in the further socioeconomic analyses, climate education and advocacy, and, under certain assumptions, for designing carbon finance schemes and transactions.

Introduction

Amidst the global climate crisis, services of protected ecosystems able to mitigate climate changes through carbon sequestration, emission reduction and storage gain special importance (Nabuurs et al. 2022, Nair et al. 2021). In order to adequately account for the benefits and costs arising from their provision through the protected ecosystems' management and stewardship, economic valuation techniques are widely used in the scientific literature and conservation practice. Unlike some other ecosystems valuable in this regard (e.g., peatlands), in case of the woodland (including old-growth, naturally dynamic, and nature protected forest sites) there exists a wider academic and political consensus on their ability to provide deposition of carbon from the atmosphere into the soil and tree biomass. Moreover, this ecosystem service is routinely commodified through the functional carbon markets – the feature which facilitates its monetary valuation based on those market signals.

Recent studies have indicated that precisely well-protected primary old growth forest areas with non-interventional management can significantly contribute to the removal of carbon from the atmosphere and to the sustainable development goals' fulfilment (Keith et al. 2024). Whereas young, agroforestry or commercial forestry stands sequestrate carbon from the atmosphere at higher pace, the old stands protected in this fashion enjoy a much higher carbon efficiency than young stands and/or commercial stands in terms of carbon long-term storage in the form of above and below ground biomass e.g., due to their multilayer structure, high volume old growth stands or carbon migration to the soil.

The analysis of carbon storage in the target mountain protected areas belonging to the transboundary International Biosphere Reserve (IBR) „East Carpathians" was conducted by calculating above-ground and below-ground biomass. The target cross-border region comprises the protected areas (PAs) as follows (Fig.1) that are covered by the analysis:

→ Nadsianskyi Regional Landscape Park (RLP);
→ Uzhanskyi National Nature Park (NNP);
→ Ciśniańsko-Wetliński Landscape Park (LP);
→ Bieszczadzki National Park (NP) – main polygon and Tarnawa protection circuit included;
→ Landscape Park (LP) Doliny Sanu;
→ Poloniny National Park (NP).

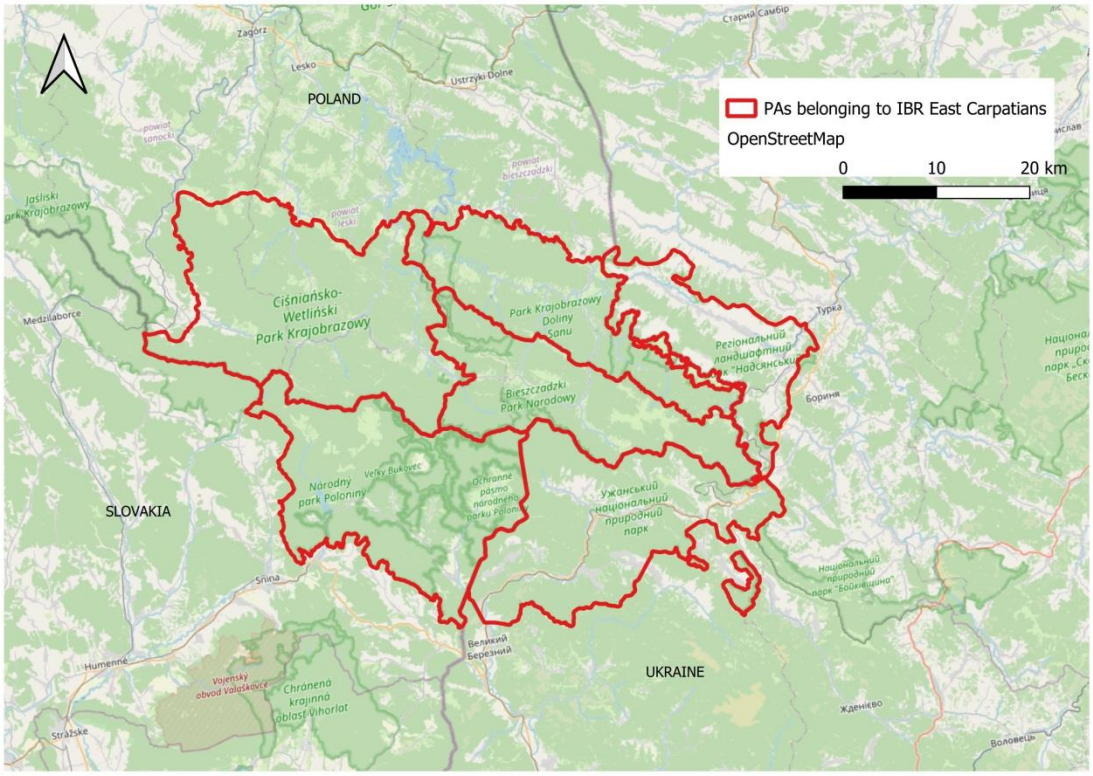


Fig.1 – Protected areas belonging to the IBR East Carpathians. Situation map

The analysis was carried out using open-source data available for EU Member States (e.g., by European Space Agency) and onsite data collection (e.g., from the Bieszczadzki NP). Specific formulae (IPCC 2006, Somogyi et al. 2007, Zianis et al. 2005) were used to determine the total carbon amount stored in PAs. This number was subsequently used to calculate carbon credits or carbon certificates that can be traded on the international carbon voluntary market. The analysis of carbon storage allows to identify the potential revenue streams for the PAs under consideration in relation to possible management and governance strategies. This new source of income for PAs has not yet been explored in this area and valuation could provide valuable economic data for the preservation and enhancement of protection and sustainable management of the PAs involved.

Materials and methods

The departure point for this analysis was the European Space Agency (ESA) Biomass Climate Change Initiative global dataset of forest above-ground biomass (AGB) comprising mapped data for the years 2010, 2015, 2016, 2017, 2018, 2019, 2020 and 2021 (v5.01)[1] produced as a result of the repeated

[1] https://data.ceda.ac.uk/neodc/esacci/biomass/data/agb/maps/v5.0/geotiff

satellite telemetry in the form of geotiff raster maps. AGB there is defined as the mass, expressed as oven-dry weight of the woody parts (stem, bark, branches and twigs), of all living trees excluding stump and roots. The database comprises *inter alia* the yearly maps representing annual average AGB (in Mg or metric tonnes) of every hectare of the given area.

Since the AGB annual storage increments rather than AGB storage snapshot estimations are required for the purposes of the carbon storage analysis, they have been calculated using the tools of the QGIS v.3.40.7-Bratislava. The Zonal statistic tool has been used in order to obtain the total AGB within the boundaries of the appropriate PAs derived from the vector layer of the Eastern Carpathians Transboundary Biosphere Reserve. For the purposes of analysing sensitivity of the results to the exact methodological solutions chosen, increments for the two periods have been calculated – for 2010 – 2021 (eleven years) and for 2015 – 2021 (six years). Descriptive statistics of the geotiff rasters for the appropriate years are presented in the Annex 1.

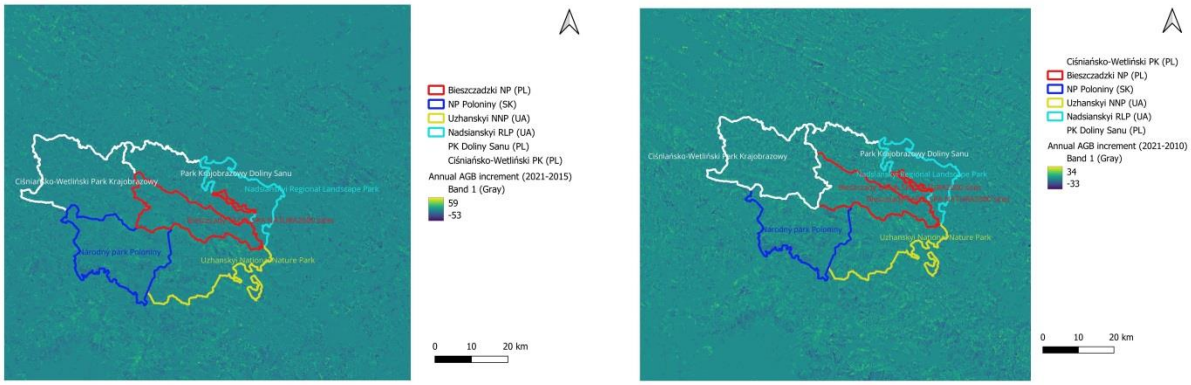
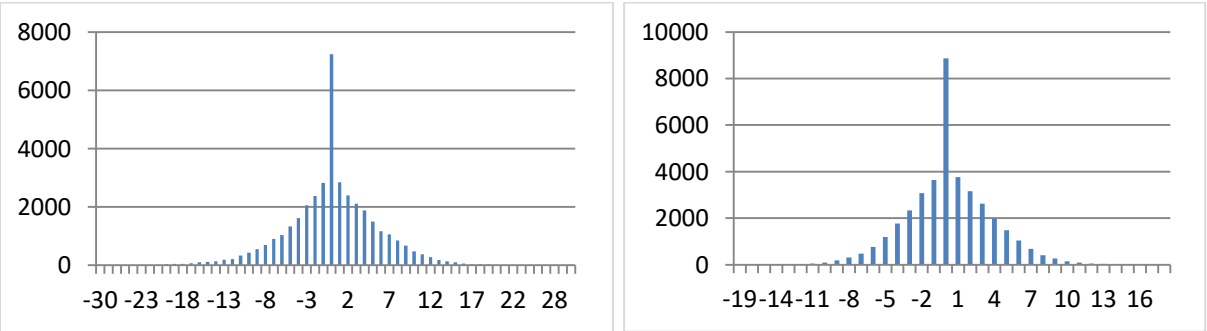
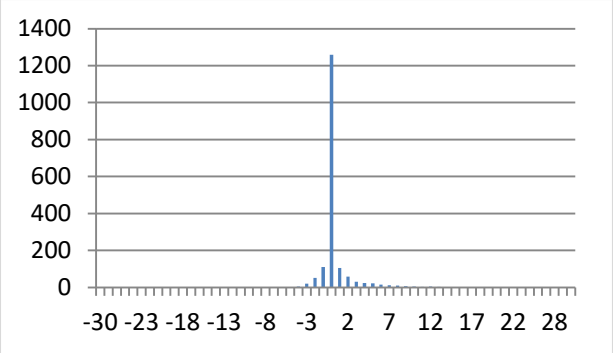
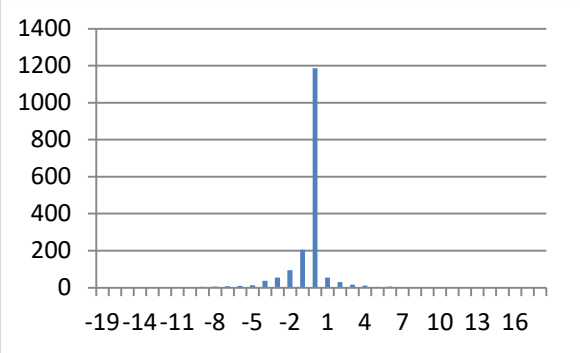


Fig.2 – Maps of the annual AGB increment (left – calculated from the period 2015 – 2021; right – calculated from the period 2010 – 2021 with the help of QGIS tools)

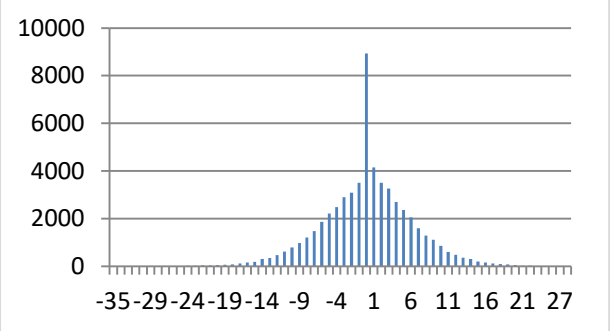


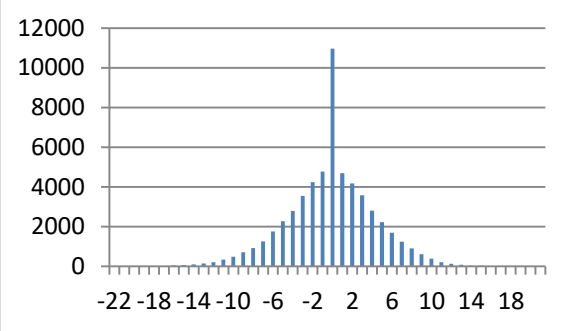
Bieszczadzki NP, main polygon (PL)



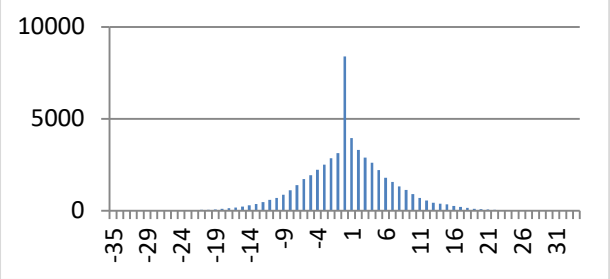


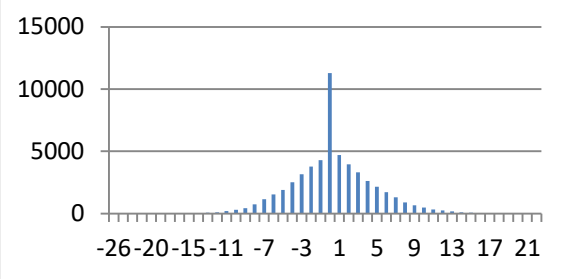
Bieszczadzki NP, Tarnawa circuit (PL)



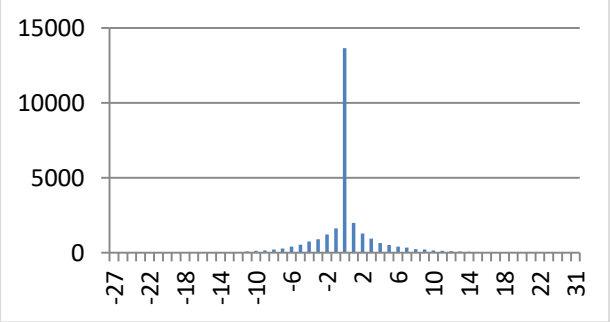


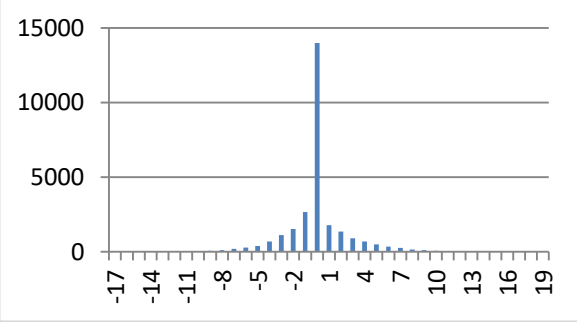
NP Poloniny (SK)



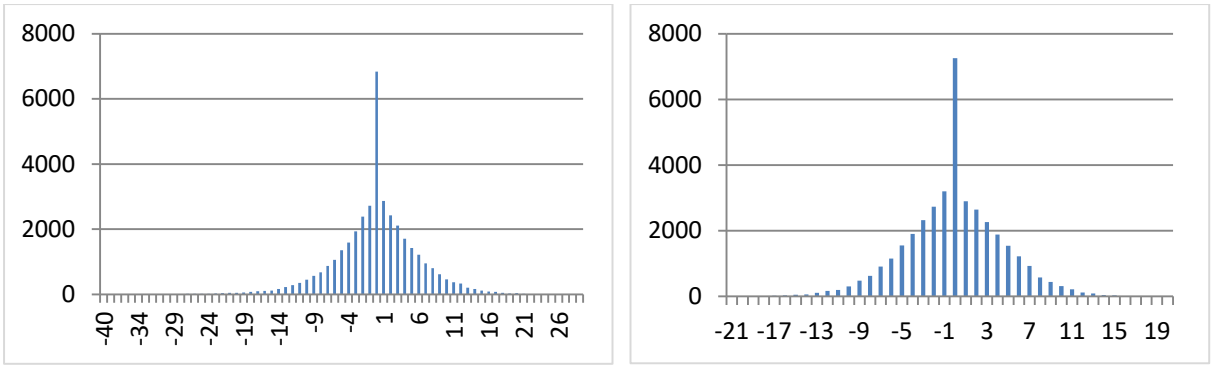


Uzhanski NP (UA)

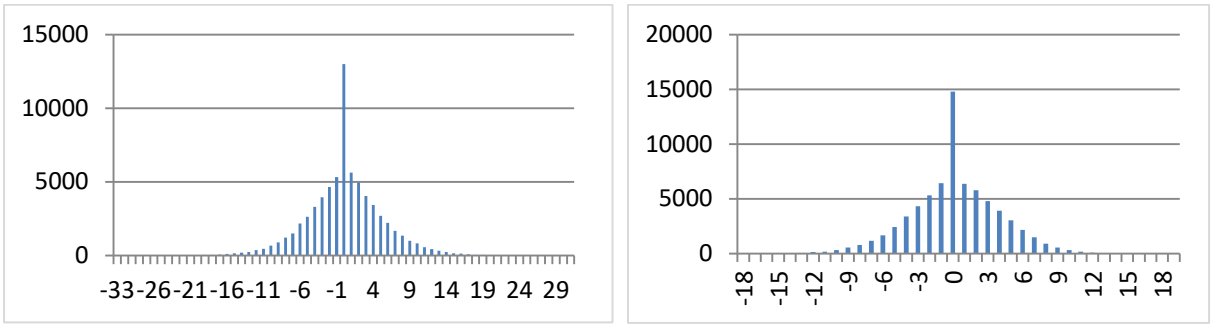




Nadsianskyi RLP (UA)



LP Doliny Sanu (PL)



Ciśniańsko-Wetliński LP (PL)

Fig. 3 – Empirical distributions of the annual AGB increments, Mg*[ha*year]$^{-1}$. Leftmost pictures represent the values estimated from the period 2015 – 2021, while rightmost pictures represent the values estimated from the period 2010 – 2021 for the given PA.

The carbon storage estimation procedure was as follows:

First, the difference between the AGB values of the end (AGB_N) and start (AGB_0) years of the measurement periods was calculated, then it was divided by the period duration Nin years to obtain total annual AGB increment AGB_{ai} in Mg*year^{-1} and the average annual AGB increment AGB_{aai}in Mg*[ha*year]$^{-1}$:

$$AGB_{ai} = \frac{AGB_N - AGB_0}{N} \quad (1)$$

$$AGB_{aai} = \frac{AGB_N - AGB_0}{N * S} \quad (2)$$

AGB average annual increments for the seven PAs calculated from the eleven and six years periods are visualised on the maps (Fig.2). In the both cases, the overwhelming majority of plots encountered little or no changes in terms of AGB (Fig.3) which might correspond to the open area plots situation. Indeed, AGB annual increment distribution for the PAs under consideration is close to symmetry that is AGB net growth in some plots is outbalanced by the same decline in the others. Median AGB increment is equal to zero for the four out of seven PAs in 2015 – 2021. Average annual

AGB increments estimated for the 2015 – 2021 are higher compared to the estimates from 2021 – 2010, which suggests that scale of changes in terms AGB was bigger in the more recent years.

Then the above-ground biomass increment was then multiplied by 1.24 to obtain the total biomass (the sum of AGB and belowground biomass, BGB) and by 0.49 to obtain the total carbon for a PA. After it, in order to obtain the carbon storage mass in Mg of carbon dioxide equivalent, the previous result was multiplied by 44/12 which is the ratio of the carbon dioxide molecular mass to carbon atomic mass. The product of the formula (3) is equal to maximal number of carbon credits (or certificates) that the appropriate PA might annually trade on the international carbon voluntary markets.

$$CC_a = \frac{AGB_{ai} * 1.24 * 0.49 * 44}{12} \quad (3)$$

For the next step, the statistical data on carbon credits quotations from international voluntary markets was used (Forest trends 2023, 2024). For the purposes of sensitivity analysis, multitude of the following prices was used (dependent on the exact year quotation data availability):

→ mean `2024 global price of the voluntary market carbon credit (equal to USD 6.34);
→ mean `regional price of the voluntary market carbon credit for Europe (equal to USD 29.19);
→ mean `2024 global price of the voluntary market carbon credit obtained in the component Forestry&Land Use (equal to USD 9.27);
→ mean `2023 price of the voluntary market carbon credit accounting for the certified co-benefits, e.g., biodiversity in the case of CCB certification (equal to USD 8.35);
→ mean `2023 price of the voluntary market carbon credit consistent with the UN Sustainable Development Goals (SDG), equal to USD 8.27.

For each value, carbon certificates were multiplied by the appropriate price to get the maximal potential revenue that a PA can potentially obtain if it opts for carbon certification. All the monetary values are denominated in the `2024 US dollars (1.03 coefficient was used in addition to account for the 2024/2023 prices difference)[2].

Results& Discussion

[2] https://www.bls.gov/data/inflation_calculator.htm

The detailed carbon credits estimation results are reported in the Annex 2, whilst their monetary valuation results are presented in the Table 1. Positive values represent the estimated benefits equal to revenue from hypothetic selling out on voluntary markets the carbon credits from biomass generated by the protected areas, whereas negative signs mean that appropriated values have been foregone as a result of biomass loss. For some of the PAs (i.e., Nadsianskyi LRP, Poloniny NP, Bieszczadzki NP Tarnawa exclave) the answer whether the PA will gain from carbon credits or not depends on the particular assumptions used in estimation. If the positive annual AGB increment of 2015 – 2021 is used, they would gain; otherwise, they would not. Overall, the entire IBR East Carpathians would gain from 314 to 2,781 thousand USD*year^{-1} because of its carbon storage potential (dependent on the choice of voluntary market prices and period used for annual AGB increment calculation).

Table 1 – Monetary valuation of the ecosystem service of carbon sequestration from the atmosphere and deposition of into the forest AGB and BGB of the PAs belonging to IBR East Carpathians

Protected Area	**Country**	**Area, ha**	**Period**	**Monetary valuation `2024 USD**				
				2024 global	**2024 Europe**	**2024 Forestry & Land Use**	**2023 Co-Benefits**	**2023 SDG**
Nadsianskyi RLP	UA	19,889	2015 – 2021	58,950	271,410	86,193	77,669	76,903
			2010 – 2021	-4,609	-21,220	-6,739	-6,073	-6,013
Uzhanskyi NNP	UA	39,299	2015 – 2021	279,532	1,286,995	408,717	368,299	364,666
			2010 – 2021	196,748	905,849	287,675	259,227	256,670
Ciśniańsko-Wetliński LP	PL	51,509	2015 – 2021	128,565	591,927	187,981	169,392	167,721
			2010 – 2021	136,060	626,432	198,939	179,266	177,498
Bieszczadzki NP (main poligon)	PL	27,910	2015 – 2021	60,676	279,358	88,717	79,944	79,155
			2010 – 2021	116,938	538,395	170,981	154,072	152,553
Bieszczadzki NP (Tarnawa)	PL	1,275	2015 – 2021	7,475	34,417	10,930	9,849	9,752
			2010 – 2021	-10,613	-48,865	-15,518	-13,984	-13,846
LP Doliny Sanu	PL	27,740	2015 – 2021	-12,578	-57,909	-18,391	-16,572	-16,408
			2010 – 2021	-33,712	-155,213	-49,292	-44,417	-43,979
Poloniny NP	SK	41,452	2015 – 2021	81,317	374,394	118,898	107,140	106,083
			2010 – 2021	-86,795	-399,613	-126,907	-114,357	-113,229
TOTAL		**209,074**	**2015 – 2021**	**603,938**	**2,780,592**	**883,045**	**795,722**	**787,873**
			2010 – 2021	**314,017**	**1,445,765**	**459,138**	**413,734**	**409,653**

Appropriate ecosystem services per hectare are presented in the Table 2 and Fig.4. Dependent on the assumptions regarding annual AGB and prices used, carbon storage potential of the individual PAs under consideration varies between -38,32 USD*ha^{-1} and 26,99 USD*ha^{-1}. Valuation results obtained for Uzhanski NNP, Ciśniańsko-Wetliński LP and Bieszczadzki NP (main polygon) are the relatively robust PAs in this regard, whereas the other PAs might generate either positive or negative values per hectare in terms of carbon storage ecosystem service dependent on the assumptions used in estimation. Overall, the per hectare values of carbon sequestration and deposition for the entire area of the IBR East Carpathians remain positive across the range of quotations used in the analysis and they range from 1.5 USD*ha^{-1} to 13.3 USD*ha^{-1}. The plots and entire PAs with carbon deposit having been reduced are outbalanced by those having been effective carbon sinks.

Table 2 – Monetary valuation of the carbon deposition per hectare

Protected Area	**Country**	**Area, ha**	**Period**	**Monetary valuation `2024 USD*ha^{-1}**				
				2024 global	**2024 Europe**	**2024 Forestry & Land Use**	**2023 Co-Benefits**	**2023 SDG**
Nadsianskyi RLP	UA	19,889	2015 – 2021	2.96	13.65	4.33	3.91	3.87
			2010 – 2021	-0.23	-1.07	-0.34	-0.31	-0.30
Uzhanskyi NNP	UA	39,299	2015 – 2021	7.11	32.75	10.40	9.37	9.28
			2010 – 2021	5.01	23.05	7.32	6.60	6.53
Ciśniańsko-Wetliński LP	PL	51,509	2015 – 2021	2.50	11.49	3.65	3.29	3.26
			2010 – 2021	2.64	12.16	3.86	3.48	3.45
Biewszczadzki NP (main polygon)	PL	27,910	2015 – 2021	2.17	10.01	3.18	2.86	2.84
			2010 – 2021	4.19	19.29	6.13	5.52	5.47
Biewszczadzki NP (Tarnawa)	PL	1,275	2015 – 2021	5.86	26.99	8.57	7.72	7.65
			2010 – 2021	-8.32	-38.32	-12.17	-10.97	-10.86
LP Doliny Sanu	PL	27,740	2015 – 2021	-0.45	-2.09	-0.66	-0.60	-0.59
			2010 – 2021	-1.22	-5.60	-1.78	-1.60	-1.59
Poloniny NP	SK	41,452	2015 – 2021	1.96	9.03	2.87	2.58	2.56
			2010 – 2021	-2.09	-9.64	-3.06	-2.76	-2.73
TOTAL		**209,074**	**2015 – 2021**	**2.89**	**13.30**	**4.22**	**3.81**	**3.77**
			2010 – 2021	**1.50**	**6.92**	**2.20**	**1.98**	**1.96**

It should be noted that positive and negative monetary values obtained for the carbon deposition ecosystem service are not symmetric in their interpretation in the purely financial sense. Thus, if

certified properly, positive carbon credits can be potentially sold out on the voluntary markets or used in carbon offset projects. On the contrary, negative valuation does not entail any immediate financial consequences and from the financial perspective they could be treated az zero.

Additionally, any financial transaction on carbon pools emerging from existing PAs would entail dispute over their additionality, since carbon sequestration and storage are implied by the baseline scenario whereas the central and local authorities are committed to maintain the conservation regime. Moreover, management activities in the PAs are predominately funded from dedicated public sources. Therefore, in many cases carbon pools from protected forests might compromise both organisational and financial additionality and may not be traded via voluntary markets. These limitations could be bypassed via offset mechanisms generating the so-called Mitigation Contribution Units (MCU) in the language of the Article 6.4 of the Paris Agreement. Other possibilities include spatial expansion of the de facto protection regimes outside the strict protection zone boundaries, i.e. through renting schemes. In this regard, the lower-level PAs such as Landscape Parks provide some extra room for potential commodification of the carbon deposit.

However, from the economic perspective, those market-induced values still do maintain symmetry and can be used in the cost-benefit analyses (CBA) accounting for their signs, where positive values are accounted on the benefit side whilst negative values are accounted on the cost side of their actual management regime or hypothetic scenarios.

Given the complicated character of the remote sensing methodology used in generating the dataset of AGB being the main data source of the analysis, its verification against other possible data sources is desirable. Although we failed to find any accessible and comprehensive alternative source for the entire area analysed, two existing datasets can be used in order to verify the AGB database indirectly, at least for the Bieszczadzki NP, namely:

(1) the system of 880 circular test grounds Atpole 84 (Przybylska et al. 2014) and
(2) the forest merchantable stock volume dataset of the Bieszczadzki NP based on the 2015 aerial LIDAR laser scanning data and CIR aerial orthophotomaps (ProGea 2016, Lin et al. 2016, van Leeuwen et al. 2011).

In the former case (Fig. 5), the data on merchantable growing stock volume (in cubic metres) from the 2009 inventory of the circular test grounds is available, which can be adjusted to per hectare values and calculated into dry matter biomass using the biomass conversion and expansion (BCEF) factor (IPCC 2006) and compared against the AGB reference level from the same locations in accordance with the 2010 year map taken from ESA database.

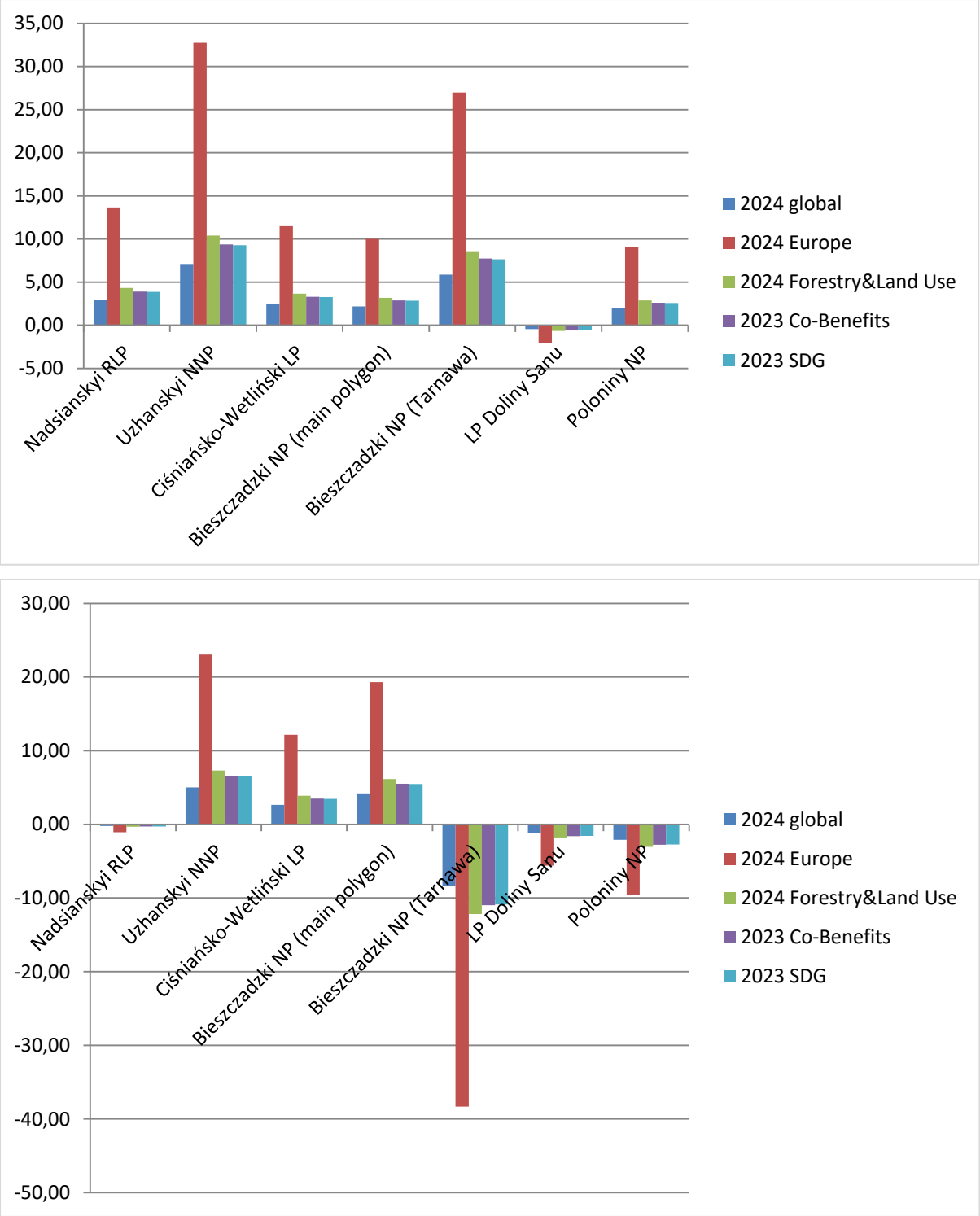


Fig.4 – Monetary valuation of the carbon deposition per hectare. The top graph represents valuation based on AGB of 2015 – 2021, whereas the bottom graph represents valuation based on AGB of 2010 – 2021

In the latter case, aerial LIDAR-detected geotiff raster map of timber merchantable growing stock volume in cubic metres (Fig. 6) was compared against the satellite AGB raster map from the year 2015 by the QGIS tools (GRASS r.mapcalc.simple raster calculator) and accounting for the BCEF factor. BCEF used in the calculations was assumed equal to 0.7 and to 0.53[3] in accordance with IPCC (2006) and Pilli (2024) correspondingly.

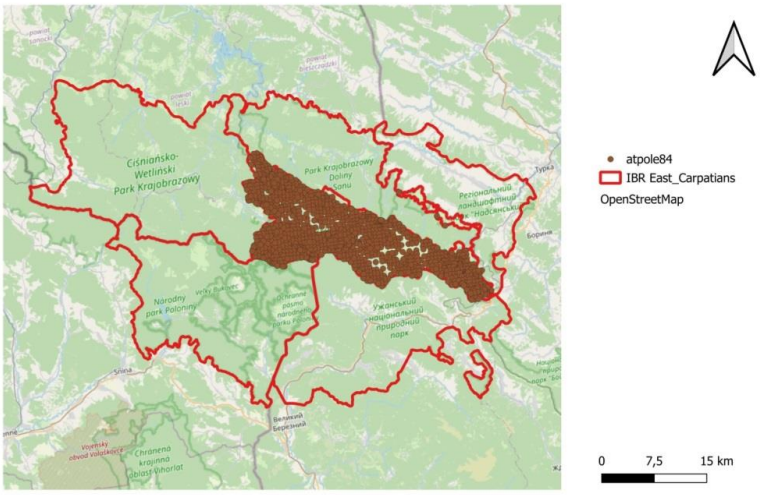


Fig. 5 – Situation map of the Atpole84 circular vegetation testing grounds within the Bieszczadzki NP area

Ad (1), the comparison descriptive statistics are presented in the Table 3 whereas the comprehensive data for the circular testing grounds is given in the Annex 3.

Ad (2), the descriptive statistics of the comparison are presented in the Table 4 whereas the empirical distribution of differences between the AGB (ESA 2010) and estimated AGB from aerial LIDAR-detected geotiff raster map with BCEF set to 0.7 is presented on the Fig. 7.

In the both cases of comparison, despite that on average the differences tend to reduce. they still exceed the annual increment. In the (1) case that difference exceeds the average annual AGB increment by the order of magnitude, (though one-year difference of data source should be accounted for, i.e. 2009 vs 2010, which means that the difference actually includes the annual increment). In the (2) case, differences in the mean values appear smaller, however the two involved inventory methods share the remote sensing approach, satellite vs airborne which are by definition inferior to the circle testing grounds approach from the case (1) in terms of their precision.

[3] Calculations based on BCEF = 0.7 are reported here for the both cases of comparison, whereas calculation assuming BCEF = 0.53 is reported for the reference purposes in the Annex 3 for the (1) case only.

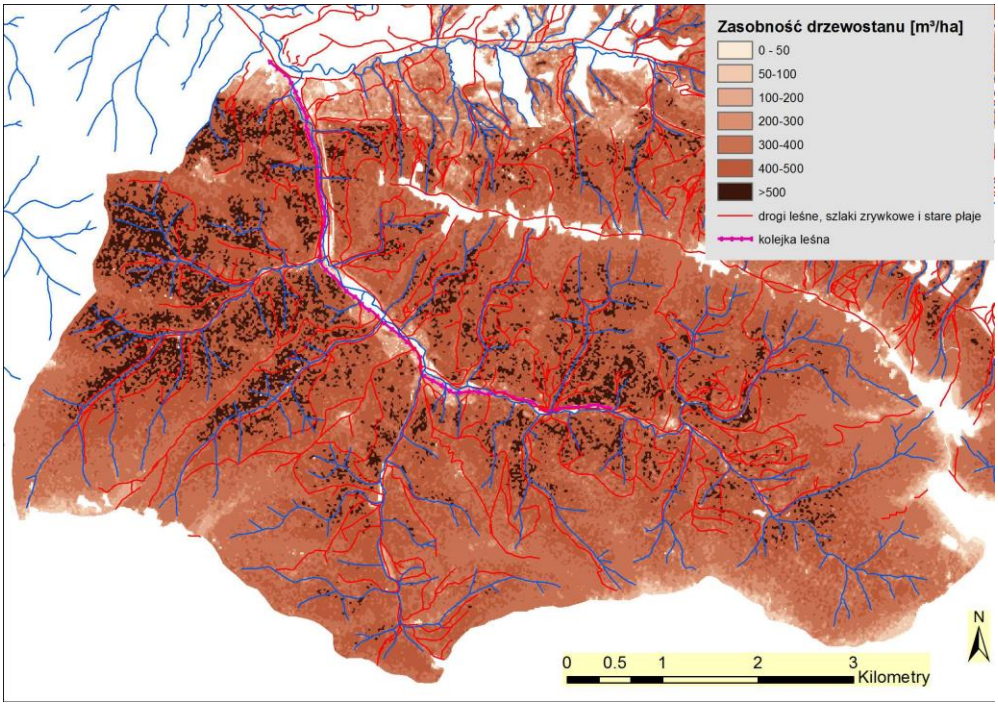


Fig.6 – Map of of merchantable growing stock volume of the Bieszczadzki NP in cubic metres (obtained from the LIDAR-produced geotiff raster)

Table 3 – Descriptive statistics and histogram of empirical distribution of the difference between the AGB of the Bieszczadzki NP, obtained from the ESA (2010) dataset vs calculated from the Atpol84 system of circular testing grounds (2009)

Mean	32.3
Standard error	4.6
Median	21.2
Standard deviation	136.4
Sample variance	18,616.7
Skewness	0.76
Min	-357.4
Max	781.3
Sum	28,459.6
N	880

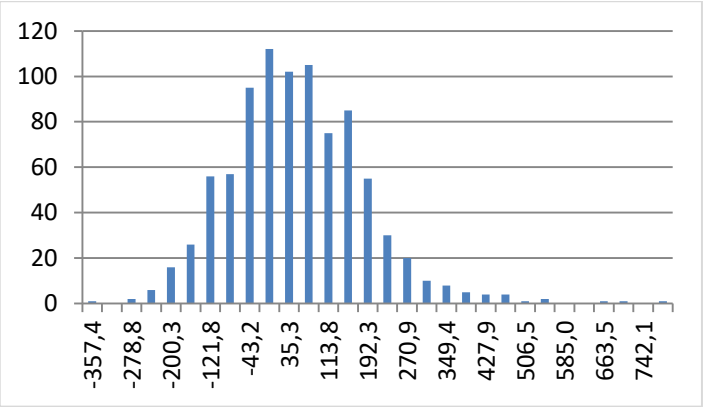


Table 4 – Descriptive statistics of the difference between the AGB of the Bieszczadzki NP, obtained from the ESA (2015) dataset vs calculated from the LIDAR-produced dataset of timber merchantable volume (2015)

PA	Country	Count	Sum	Mean	Median	St.dev	Min	Max	Range	Minority	Majority
Bieszczadzki NP (main poligon)	PL	77,108	-617,450.6	-8.0	-5.8	88.6	-351.4	351	702.4	-351.4	0
Bieszczadzki NP (Tarnawa)	PL	3,425	21,257.3	6.2	0	40.6	-220.2	260	480.2	-220.2	0

Finally, it should be taken into account that for the purposes of analyses, difference in AGB annual increments calculated from alternative datasets does matter rather than difference in two snapshot estimations, whereas this target difference in AGB annual increments is not computable from the existing datasets. Precision of two yearly snapshot estimations might be biased with substantial error margin, however the "rising tide raises all the boats equally" effect might cancel out the systemic biases in snapshot estimations, so the increment estimations might appear sufficiently accurate. Moreover, the above testing procedure itself involved multiple extrapolations and relied on assumptions which might appear too strong to derive any definite conclusions.

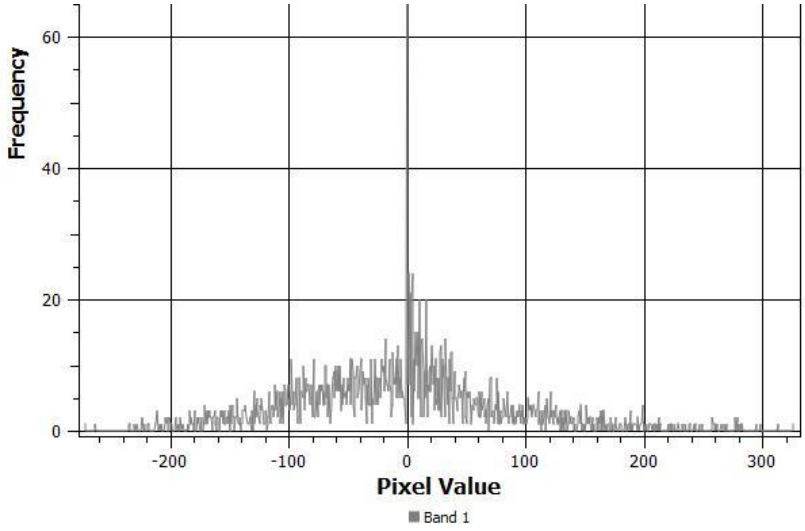


Fig. 7 – Histogram of the empirical distribution of difference between the AGB of the Bieszczadzki NP, obtained from the ESA (2015) dataset vs calculated from the LIDAR-produced dataset of timber merchantable volume (2015) plotted with the help of QGIS tools

Conclusions

Overall, the mountain forests of IBR East Carpathians deliver an ecosystem service of sequestrating carbon dioxide from atmosphere and depositing it in the form of above and below ground forest biomass. On the basis of global dataset of aboveground biomass as well as of known regularities and rational assumptions, we managed to perform a rough valuation of this ecosystem service in the case of protected areas belonging to the IBR East Carpathians. Our results fall into the range between 314 and 2,781 thousand USD per annum (corresponding to 1.5 to 13.3 USD per annum per hectare) which represents a valuable element of local ecosystem services.

At the same time, those values are not uniformly distributed across the protected areas involved. Whilst estimations assigned to some of the protected areas under consideration are robust, other

are sensitive to the assumptions and solutions used – to the extent that they might change their sign. The estimated monetary values have economic interpretation in terms of quantitative benefits and costs of the protected mountain forest stewardship; however they do not necessarily translate into financial categories of sales and revenue. Moreover, other issues such as financial and organisational additionality might potentially imped appropriate market transactions.

Given that satellite remote sensing dataset underlying our estimations relies on still quite imperfect technologies, we attempted its verification against the two alternative data sources, which retrieved mixed evidence. That said and accounting to multiple extrapolations and assumptions of the method, we recommend to treat our valuation results with some caution. Further progress in terms of onsite data precision would help to substantially improve and better substantiate this and similar valuation exercises.

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Annex 1 – Descriptive statistics of AGB (QGIS Zonal statistics obtained from ESA geotiff maps dataset)

PA name	Country	Count[4]	Year	Sum, thousand Mg[5]	Mean, Mg	Median, Mg	St.dev, Mg	Min	Max	Minority	Majority
Nadsianskyi RLP	UA	27,503	2010	2,383	86.6	39	95.1	0	342	313	0
			2015	2,343	85.2	29	99.9	0	327	316	0
			2021	2,378	86.4	33	97.5	0	321	301	0
Uzhanskyi NNP	UA	54,359	2010	9,077	167.0	179	93.5	0	372	369	0
			2015	9,125	167.9	186	95.4	0	375	366	0
			2021	9,289	170.9	184	90.0	0	380	372	0
Ciśniańsko-Wetliński LP	PL	71,241	2010	14,189	199.2	215	71.4	0	338	335	227
			2015	14,260	200.2	224	79.5	0	343	333	0
			2021	14,336	201.2	224	76.7	0	345	336	0
Bieszczadzki NP (main polygon)	PL	38,590	2010	8,399	217.7	245	90.7	0	370	363	0
			2015	8,490	220.0	252	90.8	0	364	360	267
			2021	8,525	220.9	250	91.6	0	374	368	0
Bieszczadzki NP (Tarnawa)	PL	1,755	2010	55	31.1	10	47.3	0	309	83	0
			2015	39	22.1	6	37.2	0	278	71	0
			2021	43	24.6	5	43.9	0	292	48	0
LP Doliny Sanu	PL	38,364	2010	7,815	203.7	221	77.8	0	377	359	0
			2015	7,786	202.9	227	83.5	0	364	356	0
			2021	7,779	202.8	224	82.8	0	363	345	0
Poloniny NP	SK	57,325	2010	11,130	194.2	207	75.2	0	352	347	0
			2015	10,989	191.7	210	79.2	0	352	348	0
			2021	11,037	192.5	208	79.4	0	353	353	0

[4] Note, that this count of pixels (which in the ESA dataset are of 100X100 metres in size so one pixel stands for one hectare) does not correspond to the real life PAs' surface outnumbering it by 1.56. In order to reduce this inconsistence, both the geotiff rasters and vector polygons required reprojection from their original angular Coordinate Reference System (CRS) into the metric EPSG:3035 - ETRS89-extended/LAEA Europe CRS. However, on the bad side of this reprojection, it changed the pixel size from the original 1 hectare (100X100m) into 0.7225 hectare (85X85m). Note, that if multiplied by the same correction coefficient 0.7225, the pixel counts give the values close to the PAs' real life area. For instance, for the Bieszczadzki NP, total pixel count 40,345 multiplied by 0.7225 gives 29,149 ha whereas official surface thereof is 29,200 ha. The difference can be attributed to some marginal effects and disregarded for the purposes of this analysis.

[5] To outbalance the mentioned above and avoid overestimation, the AGB values obtained from the QGIS were additionally multiplied by 0.7225. However, this correction of the AGB rests on rather strong assumptions and should be treated as inevitable downside.

Annex 2 – Calculation of the total carbon deposition of the PAs belonging to the IBR East Carpathians

Protected Area	Country	Area. thousand ha	Period	AGB. thousand Mg		Increment		(AGB+BGB). Mg	(AGB+BGB). $Mg*year^{-1}$	Carbon. Mg	CO_2e. Mg
				Start of the period	End of the period	thousand Mg	$Mg*ha^{-1}$	1.24*AGB		0.49*(AGB+BGB)	3.67* Carbon
Nadsianskyi RLP	UA	19.9	2015-2021	2,343	2,378	25.0	1.3	31,051	5,175	2,536	9.298
			2010-2021	2,383	2,378	-3.6	-0.2	-4,451	-405	-198	-727
Uzhanskyi NNP	UA	39.3	2015-2021	9,125	9,289	118.7	3.0	147,240	24,540	12,025	44,090
			2010-2021	9,077	9,289	153.2	3.9	189,997	17,272	8,464	31,033
Ciśniańsko-Wetliński LP	PL	51.5	2015-2021	14,260	14,336	54.6	1.1	67,720	11,287	5,530	20,278
			2010-2021	14,189	14,336	106.0	2.1	131,391	11,945	5,853	21,461
Bieszczadzki NP (main polygon)	PL	27.9	2015-2021	8,490	8,525	25.8	0.9	31,960	5,327	2,610	9,570
			2010-2021	8,399	8,525	91.1	3.3	112,926	10,266	5,030	18,444
Bieszczadzki NP (Tarnawa)	PL	1.3	2015-2021	39	43	3.2	2.5	3,937	656	322	1,179
			2010-2021	55	43	-8.3	-6.5	-10,249	-932	-457	-1,674
LP Doliny Sanu	PL	27.7	2015-2021	7,786	7,779	-5.3	-0.2	-6,625	-1,104	-541	-1,984
			2010-2021	7,815	7,779	-26.3	-0.9	-32,555	-2,960	-1,450	-5,317
Poloniny NP	SK	41.5	2015-2021	10,989	11,037	34.5	0.8	42,833	7,139	3,498	12,826
			2010-2021	11,130	11,037	-67.6	-1.6	-83,817	-7,620	-3,734	-13,690
TOTAL		**209.1**	2015-2021	**53,031**	**53,386**	**256.5**	**0.0**	**318,117**	**53,020**	**25,980**	**95,258**
			2010-2021	**53,048**	**53,386**	**244.5**	**0.0**	**303,242**	**27,567**	**13,508**	**49,529**

Annex 3 – Comparison of AGB of the Bieszczadzki PN. obtained from the ESA (2010) dataset vs calculated from the atpol84 system of circular testing grounds (2009)

Testing ground ID	Atpol ID	AGB (2010) from ESA dataset. Mg/ha	Merchantable volume (2009). m3/4 ares	Merchantable volume (2009). m3/ha	AGB estimate in Mg/ha with BCEF set equal to		Difference in Mg/ha between AGB (ESA. 2010) and AGB estimated from merchantable volume with BCEF set equal to	
					0.7	0.53	0.7	0.53
4GG60601	60601	364	0.379364	9.484098	6.638869	5.026572	-357.361	-358.973
4GG70183	70183	306	0.769635	19.24088	13.46862	10.19767	-292.531	-295.802
4GG71331	71331	315	1.5182	37.95501	26.56851	20.11615	-288.431	-294.884
4GG71222	71222	329	3.443942	86.09854	60.26898	45.63223	-268.731	-283.368
4GG7132	7132	287	1.758183	43.95457	30.7682	23.29592	-256.232	-263.704
4FG6949	6949	320	4.155949	103.8987	72.72911	55.06633	-247.271	-264.934
4FG69021	69021	289	2.422457	60.56144	42.393	32.09756	-246.607	-256.902
4FG69133	69133	289	2.512521	62.81302	43.96911	33.2909	-245.031	-255.709
4GG7153	7153	265	1.348609	33.71523	23.60066	17.86907	-241.399	-247.131
4FG79282	79282	283	2.709229	67.73073	47.41151	35.89729	-235.588	-247.103
4FG69503	69503	304	4.098446	102.4611	71.7228	54.30441	-232.277	-249.696
4GG70132	70132	347	6.944274	173.6069	121.5248	92.01163	-225.475	-254.988
4FG69001	69001	254	1.801379	45.03448	31.52413	23.86827	-222.476	-230.132
4FG68163	68163	309	5.172271	129.3068	90.51473	68.53258	-218.485	-240.467
4GG70123	70123	322	6.020175	150.5044	105.3531	79.76732	-216.647	-242.233
4FG68361	68361	303	5.03336	125.834	88.0838	66.69202	-214.916	-236.308
4FG5833	5833	280	3.895118	97.37795	68.16457	51.61031	-211.835	-228.39
4GG7122	7122	298	5.143417	128.5854	90.00979	68.15027	-207.99	-229.85
4FG68462	68462	318	6.315928	157.8982	110.5287	83.68605	-207.471	-234.314
4FG68552	68552	249	2.436216	60.90541	42.63378	32.27986	-206.366	-216.72
4FG6866	6866	304	5.650398	141.26	98.88197	74.86778	-205.118	-229.132
4FG69981	69981	350	8.339013	208.4753	145.9327	110.4919	-204.067	-239.508
4GG70291	70291	272	3.97008	99.25201	69.4764	52.60356	-202.524	-219.396
4FG58943	58943	261	3.349312	83.73281	58.61297	44.37839	-202.387	-216.622
4FG69572	69572	249	2.721099	68.02747	47.61923	36.05456	-201.381	-212.945
4GG71003	71003	288	5.144921	128.623	90.03612	68.17021	-197.964	-219.83
4FG69033	69033	318	6.889916	172.2479	120.5735	91.29139	-197.426	-226.709
4FG79291	79291	344	8.59019	214.7547	150.3283	113.82	-193.672	-230.18

4FG59912	59912	340	8.485638	212.1409	148.4987	112.4347	-191.501	-227.565
4FG69452	69452	354	9.327405	233.1851	163.2296	123.5881	-190.77	-230.412
4FG58822	58822	329	8.114328	202.8582	142.0007	107.5148	-186.999	-221.485
4FG58453	58453	335	8.476689	211.9172	148.3421	112.3161	-186.658	-222.684
4FG58951	58951	296	6.28104	157.026	109.9182	83.22377	-186.082	-212.776
4FG69253	69253	288	5.845578	146.1395	102.2976	77.45391	-185.702	-210.546
4FG58663	58663	316	7.569256	189.2314	132.462	100.2926	-183.538	-215.707
4GG71521	71521	298	6.550026	163.7507	114.6255	86.78785	-183.375	-211.212
4GG70153	70153	316	7.607276	190.1819	133.1273	100.7964	-182.873	-215.204
4FG7908	7908	285	5.843912	146.0978	102.2685	77.43184	-182.732	-207.568
4GG71523	71523	279	5.556574	138.9143	97.24004	73.6246	-181.76	-205.375
4GG7018	7018	292	6.442629	161.0657	112.746	85.36483	-179.254	-206.635
4GG70122	70122	252	4.31667	107.9167	75.54172	57.19587	-176.458	-194.804
4GG60913	60913	337	9.32547	233.1368	163.1957	123.5625	-173.804	-213.438
4FG5991	5991	350	10.27138	256.7845	179.7491	136.0958	-170.251	-213.904
4GG71511	71511	216	2.724261	68.10652	47.67457	36.09646	-168.325	-179.904
4GG71422	71422	258	5.134457	128.3614	89.853	68.03156	-168.147	-189.968
4FG58921	58921	248	4.570294	114.2574	79.98015	60.5564	-168.02	-187.444
4GG70092	70092	341	9.902831	247.5708	173.2995	131.2125	-167.7	-209.787
4GG71312	71312	178	0.6214	15.53499	10.87449	8.233544	-167.126	-169.766
4FG69261	69261	285	6.770883	169.2721	118.4905	89.7142	-166.51	-195.286
4FG6835	6835	253	5.138738	128.4685	89.92792	68.08828	-163.072	-184.912
4FG69743	69743	218	3.22202	80.55049	56.38534	42.69176	-161.615	-175.308
4FG6948	6948	222	3.495529	87.38823	61.17176	46.31576	-160.828	-175.684
4FG68643	68643	275	6.571076	164.2769	114.9938	87.06676	-160.006	-187.933
4FG79071	79071	294	7.712593	192.8148	134.9704	102.1919	-159.03	-191.808
4FG58672	58672	331	9.847295	246.1824	172.3277	130.4767	-158.672	-200.523
4FG58823	58823	305	8.362651	209.0663	146.3464	110.8051	-158.654	-194.195
4GG71421	71421	278	6.829232	170.7308	119.5116	90.48733	-158.488	-187.513
4GG7143	7143	182	1.347899	33.69747	23.58823	17.85966	-158.412	-164.14
4FG68573	68573	350	11.08899	277.2249	194.0574	146.9292	-155.943	-203.071
4FG69663	69663	211	3.211857	80.29643	56.2075	42.55711	-154.792	-168.443
4GG70242	70242	346	10.92835	273.2087	191.2461	144.8006	-154.754	-201.199
4GG71543	71543	286	7.564412	189.1103	132.3772	100.2285	-153.623	-185.772

4GG71233	71233	254	5.811961	145.299	101.7093	77.00848	-152.291	-176.992
4FG68152	68152	298	8.466055	211.6514	148.156	112.1752	-149.844	-185.825
4FG69531	69531	332	10.49667	262.4167	183.6917	139.0808	-148.308	-192.919
4FG69961	69961	292	8.243817	206.0954	144.2668	109.2306	-147.733	-182.769
4FG68791	68791	296	8.531718	213.293	149.3051	113.0453	-146.695	-182.955
4FG79161	79161	312	9.462336	236.5584	165.5909	125.3759	-146.409	-186.624
4FG6965	6965	298	8.690067	217.2517	152.0762	115.1434	-145.924	-182.857
4FG69552	69552	278	7.599855	189.9964	132.9975	100.6981	-145.003	-177.302
4GG71533	71533	242	5.563539	139.0885	97.36194	73.7169	-144.638	-168.283
4FG58871	58871	315	9.813546	245.3386	171.7371	130.0295	-143.263	-184.971
4GG60742	60742	338	11.14249	278.5622	194.9935	147.638	-143.006	-190.362
4GG7025	7025	289	8.395766	209.8941	146.9259	111.2439	-142.074	-177.756
4FG79192	79192	292	8.591706	214.7926	150.3549	113.8401	-141.645	-178.16
4GG71423	71423	281	7.968756	199.2189	139.4532	105.586	-141.547	-175.414
4FG6914	6914	279	7.865408	196.6352	137.6446	104.2167	-141.355	-174.783
4FG69963	69963	266	7.155319	178.883	125.2181	94.80798	-140.782	-171.192
4FG59803	59803	333	10.98507	274.6266	192.2387	145.5521	-140.761	-187.448
4FG69142	69142	330	10.88475	272.1189	190.4832	144.223	-139.517	-185.777
4GG71223	71223	154	0.866657	21.66643	15.1665	11.48321	-138.833	-142.517
4FG6932	6932	246	6.19017	154.7543	108.328	82.01975	-137.672	-163.98
4FG6911	6911	332	11.13144	278.2861	194.8003	147.4916	-137.2	-184.508
4FG5893	5893	183	2.620796	65.5199	45.86393	34.72555	-137.136	-148.274
4GG71432	71432	198	3.482032	87.05079	60.93556	46.13692	-137.064	-151.863
4GG70202	70202	348	12.11371	302.8427	211.9899	160.5066	-136.01	-187.493
4FG69443	69443	303	9.560881	239.022	167.3154	126.6817	-135.685	-176.318
4FG68442	68442	316	10.34451	258.6127	181.0289	137.0647	-134.971	-178.935
4FG68151	68151	270	7.73891	193.4727	135.4309	102.5406	-134.569	-167.459
4FG68861	68861	346	12.10125	302.5313	211.7719	160.3416	-134.228	-185.658
4FG69763	69763	220	5.073552	126.8388	88.78716	67.22457	-131.213	-152.775
4GG7013	7013	346	12.36288	309.072	216.3504	163.8082	-129.65	-182.192
4FG6955	6955	316	10.68737	267.1842	187.0289	141.6076	-128.971	-174.392
4FG6902	6902	298	9.717256	242.9314	170.052	128.7536	-127.948	-169.246
4FG6896	6896	316	10.76512	269.128	188.3896	142.6378	-127.61	-173.362
4FG68841	68841	312	10.6096	265.24	185.668	140.5772	-126.332	-171.423

4FG68371	68371	266	7.982532	199.5633	139.6943	105.7685	-126.306	-160.231
4FG69553	69553	320	11.10627	277.6568	194.3598	147.1581	-125.64	-172.842
4GG7001	7001	321	11.20871	280.2178	196.1525	148.5155	-124.848	-172.485
4FG58971	58971	328	11.70591	292.6479	204.8535	155.1034	-123.146	-172.897
4FG68863	68863	326	11.59942	289.9854	202.9898	153.6923	-123.01	-172.308
4FG6869	6869	332	11.94611	298.6526	209.0568	158.2859	-122.943	-173.714
4FG69023	69023	307	10.53153	263.2881	184.3017	139.5427	-122.698	-167.457
4FG58742	58742	229	6.096411	152.4103	106.6872	80.77744	-122.313	-148.223
4FG69751	69751	174	2.95691	73.92275	51.74593	39.17906	-122.254	-134.821
4FG69392	69392	338	12.33483	308.3708	215.8595	163.4365	-122.14	-174.563
4FG68851	68851	249	7.251654	181.2913	126.9039	96.08442	-122.096	-152.916
4FG69533	69533	225	5.921253	148.0313	103.6219	78.4566	-121.378	-146.543
4FG69892	69892	326	11.69481	292.3702	204.6591	154.9562	-121.341	-171.044
4FG6876	6876	295	9.933763	248.3441	173.8409	131.6224	-121.159	-163.378
4FG68661	68661	325	11.68472	292.1179	204.4826	154.8225	-120.517	-170.177
4FG58683	58683	283	9.299994	232.4998	162.7499	123.2249	-120.25	-159.775
4FG69841	69841	297	10.15101	253.7753	177.6427	134.5009	-119.357	-162.499
4GG71512	71512	210	5.278867	131.9717	92.38017	69.94499	-117.62	-140.055
4FG68181	68181	261	8.201598	205.04	143.528	108.6712	-117.472	-152.329
4GG60623	60623	330	12.21358	305.3395	213.7377	161.8299	-116.262	-168.17
4GG60811	60811	335	12.51362	312.8405	218.9883	165.8054	-116.012	-169.195
4GG60821	60821	352	13.56345	339.0862	237.3604	179.7157	-114.64	-172.284
4FG68153	68153	233	6.770266	169.2567	118.4797	89.70603	-114.52	-143.294
4FG68641	68641	320	11.77104	294.2759	205.9931	155.9662	-114.007	-164.034
4FG69022	69022	287	9.912315	247.8079	173.4655	131.3382	-113.534	-155.662
4FG58671	58671	212	5.681906	142.0477	99.43336	75.28526	-112.567	-136.715
4FG58893	58893	294	10.51159	262.7898	183.9529	139.2786	-110.047	-154.721
4GG70241	70241	341	13.31093	332.7733	232.9413	176.3699	-108.059	-164.63
4GG60902	60902	321	12.28384	307.096	214.9672	162.7609	-106.033	-158.239
4GG71433	71433	141	2.042555	51.06387	35.74471	27.06385	-105.255	-113.936
4GG71322	71322	132	1.568627	39.21568	27.45097	20.78431	-104.549	-111.216
4GG70182	70182	297	11.02395	275.5988	192.9192	146.0674	-104.081	-150.933
4GG7102	7102	249	8.319981	207.9995	145.5997	110.2398	-103.4	-138.76
4FG58873	58873	286	10.51627	262.9068	184.0347	139.3406	-101.965	-146.659

4GG60613	60613	217	6.575889	164.3972	115.0781	87.13053	-101.922	-129.869
4FG58833	58833	333	13.20468	330.1171	231.082	174.9621	-101.918	-158.038
4FG69252	69252	305	11.60889	290.2222	203.1555	153.8178	-101.844	-151.182
4GG70142	70142	334	13.31305	332.8263	232.9784	176.3979	-101.022	-157.602
4FG69403	69403	238	7.833017	195.8254	137.0778	103.7875	-100.922	-134.213
4FG68782	68782	239	7.911641	197.791	138.4537	104.8292	-100.546	-134.171
4GG7164	7164	247	8.386175	209.6544	146.7581	111.1168	-100.242	-135.883
4FG5899	5899	296	11.21501	280.3753	196.2627	148.5989	-99.7373	-147.401
4FG6889	6889	243	8.228952	205.7238	144.0067	109.0336	-98.9933	-133.966
4GG71323	71323	312	12.18238	304.5596	213.1917	161.4166	-98.8083	-150.583
4FG6924	6924	242	8.3139	207.8475	145.4933	110.1592	-96.5067	-131.841
4FG58931	58931	252	8.891531	222.2883	155.6018	117.8128	-96.3982	-134.187
4FG58643	58643	237	8.034826	200.8707	140.6095	106.4614	-96.3905	-130.539
4GG6084	6084	311	12.28647	307.1618	215.0133	162.7958	-95.9867	-148.204
4FG6901	6901	236	8.103611	202.5903	141.8132	107.3728	-94.1868	-128.627
4FG68281	68281	255	9.250997	231.2749	161.8924	122.5757	-93.1076	-132.424
4FG6975	6975	189	5.5119	137.7975	96.45825	73.03267	-92.5418	-115.967
4GG6060	6060	261	9.685948	242.1487	169.5041	128.3388	-91.4959	-132.661
4GG71201	71201	244	8.724967	218.1242	152.6869	115.6058	-91.3131	-128.394
4FG68381	68381	246	8.867677	221.6919	155.1844	117.4967	-90.8156	-128.503
4FG79072	79072	330	13.75964	343.9911	240.7938	182.3153	-89.2062	-147.685
4GG71531	71531	192	5.898293	147.4573	103.2201	78.15238	-88.7799	-113.848
4FG58861	58861	226	7.845768	196.1442	137.3009	103.9564	-88.6991	-122.044
4FG5855	5855	339	14.36557	359.1393	251.3975	190.3439	-87.6025	-148.656
4FG79281	79281	326	13.62462	340.6154	238.4308	180.5262	-87.5692	-145.474
4FG69242	69242	282	11.16702	279.1755	195.4228	147.963	-86.5772	-134.037
4FG68062	68062	287	11.50346	287.5864	201.3105	152.4208	-85.6895	-134.579
4FG68431	68431	299	12.1996	304.9901	213.4931	161.6447	-85.5069	-137.355
4FG58851	58851	264	10.23071	255.7677	179.0374	135.5569	-84.9626	-128.443
4GG70173	70173	336	14.37568	359.392	251.5744	190.4778	-84.4256	-145.522
4FG58622	58622	306	12.68493	317.1231	221.9862	168.0753	-84.0138	-137.925
4FG69251	69251	294	12.02542	300.6355	210.4449	159.3368	-83.5551	-134.663
4FG69752	69752	284	11.49315	287.3287	201.1301	152.2842	-82.8699	-131.716
4FG69651	69651	279	11.21214	280.3034	196.2124	148.5608	-82.7876	-130.439

4GG7133	7133	252	9.695147	242.3787	169.6651	128.4607	-82.3349	-123.539
4FG68621	68621	272	10.83943	270.9857	189.69	143.6224	-82.31	-128.378
4FG69521	69521	317	13.42754	335.6884	234.9819	177.9149	-82.0181	-139.085
4GG60721	60721	301	12.54641	313.6602	219.5621	166.2399	-81.4379	-134.76
4FG79183	79183	305	12.79765	319.9412	223.9588	169.5688	-81.0412	-135.431
4FG68273	68273	169	5.052333	126.3083	88.41583	66.94341	-80.5842	-102.057
4FG69032	69032	282	11.52167	288.0418	201.6293	152.6622	-80.3707	-129.338
4GG7002	7002	194	6.508368	162.7092	113.8964	86.23587	-80.1036	-107.764
4FG5896	5896	305	12.89399	322.3498	225.6448	170.8454	-79.3552	-134.155
4GG6042	6042	311	13.26335	331.5838	232.1087	175.7394	-78.8913	-135.261
4FG69382	69382	237	9.065709	226.6427	158.6499	120.1206	-78.3501	-116.879
4GG6082	6082	324	14.12231	353.0577	247.1404	187.1206	-76.8596	-136.879
4GG71632	71632	236	9.098545	227.4636	159.2245	120.5557	-76.7755	-115.444
4FG68622	68622	276	11.38445	284.6113	199.2279	150.844	-76.7721	-125.156
4GG70053	70053	359	16.15532	403.8829	282.7181	214.058	-76.2819	-144.942
4FG6921	6921	172	5.486935	137.1734	96.02136	72.70188	-75.9786	-99.2981
4FG69713	69713	330	14.58663	364.6658	255.266	193.2729	-74.734	-136.727
4FG5879	5879	225	8.599902	214.9976	150.4983	113.9487	-74.5017	-111.051
4FG68373	68373	299	12.83814	320.9535	224.6675	170.1054	-74.3325	-128.895
4FG69501	69501	188	6.502213	162.5553	113.7887	86.15432	-74.2113	-101.846
4FG6879	6879	281	11.87699	296.9248	207.8474	157.3702	-73.1526	-123.63
4FG69393	69393	322	14.25755	356.4389	249.5072	188.9126	-72.4928	-133.087
4FG68433	68433	292	12.55428	313.8569	219.6998	166.3442	-72.3002	-125.656
4GG6095	6095	315	13.89608	347.4021	243.1815	184.1231	-71.8185	-130.877
4FG5892	5892	234	9.269884	231.7471	162.223	122.826	-71.777	-111.174
4FG58442	58442	295	12.81136	320.284	224.1988	169.7505	-70.8012	-125.249
4FG68591	68591	269	11.3558	283.8951	198.7266	150.4644	-70.2734	-118.536
4GG70023	70023	279	11.92742	298.1856	208.7299	158.0383	-70.2701	-120.962
4FG6964	6964	271	11.47656	286.914	200.8398	152.0644	-70.1602	-118.936
4FG58962	58962	298	13.12723	328.1807	229.7265	173.9358	-68.2735	-124.064
4GG71332	71332	225	8.965796	224.1449	156.9014	118.7968	-68.0986	-106.203
4FG79171	79171	267	11.42334	285.5834	199.9084	151.3592	-67.0916	-115.641
4FG5898	5898	302	13.43398	335.8495	235.0946	178.0002	-66.9054	-124
4FG69622	69622	299	13.36265	334.0663	233.8464	177.0551	-65.1536	-121.945

4GG70152	70152	352	16.39178	409.7945	286.8562	217.1911	-65.1438	-134.809
4FG69541	69541	320	14.57488	364.3721	255.0604	193.1172	-64.9396	-126.883
4GG71333	71333	225	9.202173	230.0543	161.038	121.9288	-63.962	-103.071
4FG69891	69891	352	16.46833	411.7082	288.1957	218.2053	-63.8043	-133.795
4GG6083	6083	358	16.81546	420.3866	294.2706	222.8049	-63.7294	-135.195
4FG6962	6962	274	12.04948	301.237	210.8659	159.6556	-63.1341	-114.344
4GG70381	70381	292	13.09018	327.2544	229.0781	173.4449	-62.9219	-118.555
4FG69602	69602	280	12.43328	310.8321	217.5825	164.741	-62.4175	-115.259
4FG59903	59903	170	6.154888	153.8722	107.7105	81.55227	-62.2895	-88.4477
4GG60862	60862	322	14.89911	372.4777	260.7344	197.4132	-61.2656	-124.587
4GG7112	7112	184	7.032956	175.8239	123.0767	93.18667	-60.9233	-90.8133
4FG68651	68651	236	10.01081	250.2704	175.1893	132.6433	-60.8107	-103.357
4GG6081	6081	304	13.91209	347.8022	243.4615	184.3352	-60.5385	-119.665
4GG71321	71321	153	5.293791	132.3448	92.64133	70.14272	-60.3587	-82.8573
4FG69691	69691	360	17.12489	428.1222	299.6855	226.9048	-60.3145	-133.095
4FG58741	58741	304	13.9453	348.6326	244.0428	184.7753	-59.9572	-119.225
4FG68193	68193	268	11.90547	297.6368	208.3458	157.7475	-59.6542	-110.252
4FG6836	6836	246	10.74784	268.696	188.0872	142.4089	-57.9128	-103.591
4FG69273	69273	235	10.13078	253.2696	177.2887	134.2329	-57.7113	-100.767
4GG6062	6062	255	11.29336	282.3339	197.6337	149.637	-57.3663	-105.363
4FG6886	6886	313	14.65725	366.4312	256.5018	194.2085	-56.4982	-118.791
4FG68042	68042	325	15.34498	383.6246	268.5372	203.321	-56.4628	-121.679
4FG69732	69732	293	13.53288	338.322	236.8254	179.3107	-56.1746	-113.689
4FG69012	69012	206	8.570713	214.2678	149.9875	113.562	-56.0125	-92.438
4FG7929	7929	318	14.98782	374.6955	262.2869	198.5886	-55.7131	-119.411
4FG68653	68653	313	14.72955	368.2387	257.7671	195.1665	-55.2329	-117.834
4FG69442	69442	320	15.13005	378.2512	264.7759	200.4732	-55.2241	-119.527
4FG79172	79172	276	12.63227	315.8069	221.0648	167.3776	-54.9352	-108.622
4FG69512	69512	282	12.99146	324.7865	227.3505	172.1368	-54.6495	-109.863
4FG58341	58341	193	7.915001	197.875	138.5125	104.8738	-54.4875	-88.1262
4FG69223	69223	170	6.611569	165.2892	115.7025	87.60328	-54.2975	-82.3967
4FG59923	59923	315	14.91309	372.8271	260.979	197.5984	-54.021	-117.402
4GG60822	60822	163	6.232975	155.8244	109.0771	82.58692	-53.9229	-80.4131
4FG69522	69522	259	11.74815	293.7037	205.5926	155.663	-53.4074	-103.337

4FG68592	68592	306	14.51974	362.9936	254.0955	192.3866	-51.9045	-113.613
4FG69683	69683	209	8.987368	224.6842	157.2789	119.0826	-51.7211	-89.9174
4FG69031	69031	282	13.17209	329.3024	230.5116	174.5302	-51.4884	-107.47
4FG68742	68742	246	11.19209	279.8023	195.8616	148.2952	-50.1384	-97.7048
4FG69693	69693	297	14.13388	353.347	247.3429	187.2739	-49.6571	-109.726
4FG6985	6985	242	10.99353	274.8383	192.3868	145.6643	-49.6132	-96.3357
4FG58723	58723	270	12.61289	315.3222	220.7255	167.1207	-49.2745	-102.879
4GG6052	6052	327	15.88586	397.1466	278.0026	210.4877	-48.9974	-116.512
4FG6845	6845	284	13.42923	335.7308	235.0115	177.9373	-48.9885	-106.063
4FG58991	58991	260	12.06008	301.502	211.0514	159.796	-48.9486	-100.204
4GG60942	60942	361	17.85644	446.411	312.4877	236.5978	-48.5123	-124.402
4FG58772	58772	293	14.02245	350.5612	245.3928	185.7974	-47.6072	-107.203
4FG6954	6954	314	15.24209	381.0523	266.7366	201.9577	-47.2634	-112.042
4GG71101	71101	292	14.02838	350.7096	245.4967	185.8761	-46.5033	-106.124
4GG70162	70162	313	15.24358	381.0896	266.7627	201.9775	-46.2373	-111.023
4FG68543	68543	207	9.192496	229.8124	160.8687	121.8006	-46.1313	-85.1994
4FG69661	69661	231	10.57625	264.4062	185.0843	140.1353	-45.9157	-90.8647
4FG69573	69573	175	7.400311	185.0078	129.5054	98.05412	-45.4946	-76.9459
4FG6963	6963	306	14.89061	372.2651	260.5856	197.3005	-45.4144	-108.699
4FG6817	6817	231	10.6351	265.8775	186.1142	140.9151	-44.8858	-90.0849
4GG7154	7154	222	10.12293	253.0733	177.1513	134.1288	-44.8487	-87.8712
4GG60712	60712	298	14.4756	361.89	253.323	191.8017	-44.677	-106.198
4FG79283	79283	282	13.58614	339.6534	237.7574	180.0163	-44.2426	-101.984
4FG68342	68342	218	9.931004	248.2751	173.7926	131.5858	-44.2074	-86.4142
4FG79073	79073	328	16.23916	405.9791	284.1853	215.1689	-43.8147	-112.831
4GG71203	71203	248	11.67392	291.8481	204.2936	154.6795	-43.7064	-93.3205
4GG7110	7110	270	12.94627	323.6566	226.5597	171.538	-43.4403	-98.462
4FG6944	6944	307	15.07757	376.9392	263.8574	199.7778	-43.1426	-107.222
4FG68363	68363	258	12.28798	307.1994	215.0396	162.8157	-42.9604	-95.1843
4FG69863	69863	336	16.75177	418.7943	293.156	221.961	-42.844	-114.039
4FG68681	68681	312	15.41089	385.2723	269.6906	204.1943	-42.3094	-107.806
4FG6925	6925	290	14.16233	354.0582	247.8407	187.6508	-42.1593	-102.349
4FG68572	68572	314	15.58233	389.5583	272.6908	206.4659	-41.3092	-107.534
4FG69132	69132	259	12.44208	311.052	217.7364	164.8576	-41.2636	-94.1424

4GG70001	70001	333	16.70077	417.5193	292.2635	221.2852	-40.7365	-111.715
4FG68161	68161	274	13.337	333.4249	233.3974	176.7152	-40.6026	-97.2848
4FG68792	68792	309	15.34527	383.6318	268.5423	203.3249	-40.4577	-105.675
4GG70392	70392	325	16.29942	407.4854	285.2398	215.9673	-39.7602	-109.033
4FG69722	69722	329	16.59921	414.9802	290.4862	219.9395	-38.5138	-109.06
4GG70181	70181	243	11.69714	292.4285	204.6999	154.9871	-38.3001	-88.0129
4FG6957	6957	293	14.56349	364.0873	254.8611	192.9663	-38.1389	-100.034
4FG79391	79391	334	16.91069	422.7673	295.9371	224.0667	-38.0629	-109.933
4FG69491	69491	324	16.34599	408.6497	286.0548	216.5843	-37.9452	-107.416
4FG69711	69711	55	1.066847	26.67116	18.66981	14.13572	-36.3302	-40.8643
4GG70061	70061	327	16.6408	416.02	291.214	220.4906	-35.786	-106.509
4GG70013	70013	192	8.927921	223.198	156.2386	118.295	-35.7614	-73.705
4FG5894	5894	270	13.43721	335.9303	235.1512	178.043	-34.8488	-91.957
4FG68553	68553	314	15.95865	398.9662	279.2764	211.4521	-34.7236	-102.548
4FG6815	6815	275	13.73383	343.3458	240.3421	181.9733	-34.6579	-93.0267
4FG6885	6885	279	13.96532	349.133	244.3931	185.0405	-34.6069	-93.9595
4FG6953	6953	242	11.88256	297.064	207.9448	157.4439	-34.0552	-84.5561
4FG6862	6862	302	15.33729	383.4323	268.4026	203.2191	-33.5974	-98.7809
4GG7009	7009	282	14.20185	355.0464	248.5325	188.1746	-33.4675	-93.8254
4FG68743	68743	288	14.55602	363.9005	254.7303	192.8673	-33.2697	-95.1327
4GG71542	71542	190	8.990415	224.7604	157.3323	119.123	-32.6677	-70.877
4FG59913	59913	239	11.85011	296.2528	207.377	157.014	-31.623	-81.986
4FG68781	68781	286	14.54199	363.5499	254.4849	192.6814	-31.5151	-93.3186
4GG71202	71202	249	12.4572	311.43	218.001	165.0579	-30.999	-83.9421
4FG6986	6986	197	9.487771	237.1943	166.036	125.713	-30.964	-71.287
4FG68852	68852	283	14.45048	361.262	252.8834	191.4689	-30.1166	-91.5311
4GG7152	7152	280	14.31234	357.8085	250.466	189.6385	-29.534	-90.3615
4GG7028	7028	325	16.91314	422.8286	295.98	224.0992	-29.02	-100.901
4GG6093	6093	306	15.84447	396.1118	277.2783	209.9393	-28.7217	-96.0607
4FG68562	68562	319	16.59509	414.8773	290.4141	219.885	-28.5859	-99.115
4FG79193	79193	339	17.73908	443.4769	310.4339	235.0428	-28.5661	-103.957
4FG7917	7917	313	16.26844	406.7109	284.6976	215.5568	-28.3024	-97.4432
4FG5872	5872	297	15.37258	384.3145	269.0201	203.6867	-27.9799	-93.3133
4FG69492	69492	278	14.36993	359.2481	251.4737	190.4015	-26.5263	-87.5985

4FG58642	58642	312	16.32899	408.2249	285.7574	216.3592	-26.2426	-95.6408
4FG68693	68693	307	16.08363	402.0907	281.4635	213.1081	-25.5365	-93.8919
4FG58941	58941	298	15.60539	390.1348	273.0943	206.7714	-24.9057	-91.2286
4GG60522	60522	318	16.8014	420.035	294.0245	222.6185	-23.9755	-95.3815
4FG6972	6972	262	13.65041	341.2602	238.8822	180.8679	-23.1178	-81.1321
4GG60503	60503	306	16.18331	404.5828	283.208	214.4289	-22.792	-91.5711
4GG60643	60643	276	14.50378	362.5945	253.8162	192.1751	-22.1838	-83.8249
4GG71522	71522	188	9.487188	237.1797	166.0258	125.7052	-21.9742	-62.2948
4GG71023	71023	97	4.311584	107.7896	75.45272	57.12849	-21.5473	-39.8715
4FG58553	58553	297	15.75389	393.8473	275.6931	208.739	-21.3069	-88.261
4FG6910	6910	268	14.10066	352.5164	246.7615	186.8337	-21.2385	-81.1663
4GG60863	60863	341	18.2766	456.9149	319.8405	242.1649	-21.1595	-98.8351
4FG6854	6854	243	12.68452	317.1129	221.979	168.0698	-21.021	-74.9302
4GG70131	70131	260	13.67292	341.8231	239.2762	181.1662	-20.7238	-78.8338
4FG69241	69241	294	15.64153	391.0383	273.7268	207.2503	-20.2732	-86.7497
4GG70193	70193	286	15.19689	379.9223	265.9456	201.3588	-20.0544	-84.6412
4GG70093	70093	233	12.18087	304.5218	213.1652	161.3965	-19.8348	-71.6035
4FG58972	58972	247	12.98416	324.6039	227.2227	172.0401	-19.7773	-74.9599
4FG69122	69122	292	15.58944	389.736	272.8152	206.5601	-19.1848	-85.4399
4FG5897	5897	313	16.84321	421.0802	294.7561	223.1725	-18.2439	-89.8275
4FG69772	69772	140	6.965406	174.1351	121.8946	92.29163	-18.1054	-47.7084
4GG60932	60932	330	17.82545	445.6362	311.9454	236.1872	-18.0546	-93.8128
4FG68432	68432	254	13.49469	337.3673	236.1571	178.8047	-17.8429	-75.1953
4GG7123	7123	202	10.54219	263.5549	184.4884	139.6841	-17.5116	-62.3159
4GG71311	71311	277	14.83051	370.7628	259.5339	196.5043	-17.4661	-80.4957
4GG7111	7111	300	16.20181	405.0453	283.5317	214.674	-16.4683	-85.326
4FG68633	68633	234	12.43317	310.8292	217.5804	164.7395	-16.4196	-69.2605
4FG69783	69783	251	13.47361	336.8402	235.7881	178.5253	-15.2119	-72.4747
4FG5845	5845	325	17.73232	443.3081	310.3156	234.9533	-14.6844	-90.0467
4FG58752	58752	309	16.82172	420.5429	294.38	222.8877	-14.62	-86.1123
4GG70033	70033	309	16.82376	420.5939	294.4157	222.9148	-14.5843	-86.0852
4FG68533	68533	320	17.45417	436.3542	305.4479	231.2677	-14.5521	-88.7323
4FG69951	69951	281	15.22618	380.6546	266.4582	201.7469	-14.5418	-79.2531
4FG58863	58863	241	12.94184	323.5459	226.4821	171.4793	-14.5179	-69.5207

4GG71303	71303	298	16.20299	405.0746	283.5522	214.6896	-14.4478	-83.3104
4GG6071	6071	245	13.19755	329.9389	230.9572	174.8676	-14.0428	-70.1324
4FG58963	58963	316	17.28208	432.0519	302.4364	228.9875	-13.5636	-87.0125
4GG71431	71431	154	8.033236	200.8309	140.5816	106.4404	-13.4184	-47.5596
4GG70043	70043	329	18.03339	450.8347	315.5843	238.9424	-13.4157	-90.0576
4FG68673	68673	272	14.77804	369.451	258.6157	195.809	-13.3843	-76.191
4FG58973	58973	23	0.573372	14.33429	10.034	7.597174	-12.966	-15.4028
4FG69601	69601	257	13.95584	348.8959	244.2272	184.9148	-12.7728	-72.0852
4FG5856	5856	271	14.78093	369.5233	258.6663	195.8473	-12.3337	-75.1527
4FG58981	58981	231	12.51632	312.9079	219.0355	165.8412	-11.9645	-65.1588
4FG69352	69352	305	16.7483	418.7074	293.0952	221.9149	-11.9048	-83.0851
4FG69653	69653	210	11.3203	283.0075	198.1052	149.994	-11.8948	-60.006
4FG69583	69583	237	12.86951	321.7377	225.2164	170.521	-11.7836	-66.479
4FG69311	69311	309	17.01537	425.3843	297.769	225.4537	-11.231	-83.5463
4FG69782	69782	225	12.22262	305.5656	213.8959	161.9498	-11.1041	-63.0502
4FG69221	69221	323	17.83813	445.9533	312.1673	236.3553	-10.8327	-86.6447
4FG6888	6888	252	13.80022	345.0055	241.5039	182.8529	-10.4961	-69.1471
4FG58542	58542	189	10.23778	255.9446	179.1612	135.6506	-9.83879	-53.3494
4FG68483	68483	296	16.36464	409.1159	286.3812	216.8314	-9.61884	-79.1686
4FG59911	59911	323	17.91188	447.7969	313.4578	237.3324	-9.54218	-85.6676
4GG60521	60521	256	14.09923	352.4809	246.7366	186.8149	-9.26339	-69.1851
4FG68452	68452	241	13.25978	331.4945	232.0462	175.6921	-8.95383	-65.3079
4GG70041	70041	348	19.4034	485.0849	339.5594	257.095	-8.44056	-90.905
4FG68663	68663	230	12.66466	316.6164	221.6315	167.8067	-8.3685	-62.1933
4GG70161	70161	309	17.21087	430.2719	301.1903	228.0441	-7.8097	-80.9559
4FG6856	6856	219	12.13314	303.3286	212.33	160.7641	-6.67001	-58.2359
4GG71013	71013	190	10.48275	262.0687	183.4481	138.8964	-6.55193	-51.1036
4FG79182	79182	301	16.84833	421.2083	294.8458	223.2404	-6.1542	-77.7596
4FG69753	69753	238	13.26234	331.5585	232.0909	175.726	-5.90907	-62.274
4FG68451	68451	275	15.3874	384.6849	269.2794	203.883	-5.72056	-71.117
4GG6096	6096	280	15.68851	392.2128	274.549	207.8728	-5.45102	-72.1272
4FG79181	79181	238	13.30395	332.5986	232.819	176.2773	-5.18096	-61.7227
4FG59922	59922	124	6.802248	170.0562	119.0393	90.12978	-4.96067	-33.8702
4GG60533	60533	337	18.98714	474.6785	332.275	251.5796	-4.72505	-85.4204

4FG6848	6848	264	14.83166	370.7916	259.5541	196.5196	-4.44588	-67.4804
4FG68671	68671	295	16.60568	415.1419	290.5993	220.0252	-4.40066	-74.9748
4FG6849	6849	266	14.96854	374.2135	261.9494	198.3332	-4.05056	-67.6668
4FG68551	68551	278	15.65879	391.4699	274.0289	207.479	-3.97109	-70.521
4GG71102	71102	271	15.27973	381.9932	267.3952	202.4564	-3.60479	-68.5436
4FG68083	68083	259	14.59478	364.8695	255.4086	193.3808	-3.59135	-65.6192
4FG69613	69613	289	16.3384	408.4601	285.9221	216.4838	-3.07794	-72.5162
4FG6996	6996	259	14.64285	366.0712	256.2498	194.0177	-2.75017	-64.9823
4GG70171	70171	315	17.8449	446.1224	312.2857	236.4449	-2.71432	-78.5551
4FG58952	58952	265	15.00597	375.1491	262.6044	198.829	-2.3956	-66.171
4FG7906	7906	260	14.77455	369.3637	258.5546	195.7628	-1.44539	-64.2372
4GG7162	7162	277	15.74858	393.7144	275.6001	208.6686	-1.39993	-68.3314
4FG69852	69852	252	14.34461	358.6151	251.0306	190.066	-0.96941	-61.934
4FG58753	58753	295	16.80311	420.0777	294.0544	222.6412	-0.9456	-72.3588
4FG69853	69853	275	15.72227	393.0567	275.1397	208.32	0.139676	-66.68
4FG68263	68263	227	13.00784	325.196	227.6372	172.3539	0.637234	-54.6461
4FG68581	68581	292	16.75789	418.9472	293.263	222.042	1.263043	-69.958
4FG68162	68162	276	15.87884	396.9711	277.8798	210.3947	1.879767	-65.6053
4FG69972	69972	232	13.41414	335.3535	234.7475	177.7374	2.747478	-54.2626
4FG68761	68761	259	14.98784	374.6961	262.2873	198.5889	3.287262	-60.4111
4GG60973	60973	259	14.98843	374.7107	262.2975	198.5967	3.29748	-60.4033
4FG68463	68463	328	18.94011	473.5028	331.452	250.9565	3.451995	-77.0435
4GG71413	71413	113	6.677319	166.933	116.8531	88.47448	3.853086	-24.5255
4FG69843	69843	313	18.10701	452.6753	316.8727	239.9179	3.872729	-73.0821
4FG6979	6979	246	14.30554	357.6384	250.3469	189.5484	4.346882	-56.4516
4GG70192	70192	262	15.23789	380.9472	266.6631	201.902	4.663058	-60.098
4FG69371	69371	243	14.17211	354.3028	248.0119	187.7805	5.011946	-55.2195
4FG6878	6878	252	14.68869	367.2172	257.052	194.6251	5.052013	-57.3749
4FG69792	69792	317	18.40514	460.1285	322.0899	243.8681	5.089939	-73.1319
4GG70082	70082	242	14.15791	353.9478	247.7634	187.5923	5.763445	-54.4077
4FG6970	6970	354	20.57447	514.3617	360.0532	272.6117	6.053201	-81.3883
4FG69101	69101	212	12.54327	313.5817	219.5072	166.1983	7.507216	-45.8017
4FG6858	6858	265	15.57573	389.3933	272.5753	206.3784	7.575306	-58.6216
4GG60722	60722	225	13.30935	332.7338	232.9137	176.3489	7.913667	-48.6511

4FG6863	6863	259	15.25734	381.4335	267.0034	202.1597	8.003442	-56.8403
4FG58331	58331	307	18.04614	451.1534	315.8074	239.1113	8.807374	-67.8887
4FG69361	69361	187	11.21617	280.4041	196.2829	148.6142	9.282891	-38.3858
4FG6956	6956	320	18.85438	471.3595	329.9516	249.8205	9.951618	-70.1795
4FG69111	69111	319	18.81773	470.4431	329.3102	249.3349	10.31019	-69.6651
4FG58743	58743	166	10.08431	252.1078	176.4755	133.6171	10.47547	-32.3829
4FG68172	68172	283	16.77461	419.3653	293.5557	222.2636	10.55573	-60.7364
4FG69473	69473	314	18.62134	465.5335	325.8735	246.7328	11.87346	-67.2672
4GG71113	71113	271	16.18164	404.541	283.1787	214.4067	12.1787	-56.5933
4FG79083	79083	196	11.91005	297.7513	208.4259	157.8082	12.42592	-38.1918
4FG69871	69871	228	13.7828	344.5699	241.199	182.6221	13.19896	-45.3779
4FG69811	69811	299	17.84651	446.1628	312.314	236.4663	13.31399	-62.5337
4FG69571	69571	339	20.13532	503.3829	352.368	266.7929	13.36803	-72.2071
4FG69121	69121	294	17.57849	439.4623	307.6236	232.915	13.62361	-61.085
4GG6090	6090	281	16.85244	421.311	294.9177	223.2948	13.9177	-57.7052
4FG69543	69543	271	16.30833	407.7082	285.3958	216.0854	14.39577	-54.9146
4GG60532	60532	313	18.70949	467.7373	327.4161	247.9008	14.4161	-65.0992
4FG58731	58731	238	14.46447	361.6118	253.1283	191.6543	15.12827	-46.3457
4FG5867	5867	305	18.29514	457.3785	320.1649	242.4106	15.16492	-62.5894
4FG58751	58751	295	17.74275	443.5687	310.4981	235.0914	15.4981	-59.9086
4FG68642	68642	232	14.1544	353.8601	247.7021	187.5458	15.70206	-44.4542
4FG69482	69482	252	15.30027	382.5068	267.7548	202.7286	15.75476	-49.2714
4FG68692	68692	315	18.93866	473.4664	331.4265	250.9372	16.42647	-64.0628
4FG79061	79061	285	17.2788	431.9701	302.3791	228.9441	17.37906	-56.0559
4FG69612	69612	177	11.12079	278.0197	194.6138	147.3504	17.61376	-29.6496
4FG6950	6950	136	8.817103	220.4276	154.2993	116.8266	18.2993	-19.1734
4FG59901	59901	356	21.40694	535.1735	374.6215	283.642	18.62146	-72.358
4FG68353	68353	244	15.01473	375.3683	262.7578	198.9452	18.75781	-45.0548
4FG69463	69463	242	14.90645	372.6611	260.8628	197.5104	18.8628	-44.4896
4FG69862	69862	240	14.7966	369.9151	258.9406	196.055	18.94058	-43.945
4FG6834	6834	224	13.93984	348.4959	243.9472	184.7029	19.94716	-39.2971
4FG6818	6818	229	14.23143	355.7858	249.05	188.5665	20.05003	-40.4335
4FG68571	68571	190	12.00559	300.1398	210.0979	159.0741	20.09788	-30.9259
4GG70491	70491	285	17.46552	436.638	305.6466	231.4181	20.64657	-53.5819

4FG58932	58932	316	19.25313	481.3283	336.9298	255.104	20.9298	-60.896
4FG79293	79293	294	17.9975	449.9374	314.9562	238.4668	20.95619	-55.5332
4GG60943	60943	340	20.62729	515.6823	360.9776	273.3116	20.97763	-66.6884
4GG7163	7163	292	17.89499	447.3747	313.1623	237.1086	21.16227	-54.8914
4FG5886	5886	283	17.38983	434.7456	304.3219	230.4152	21.32195	-52.5848
4GG60753	60753	212	13.33274	333.3184	233.3229	176.6587	21.32287	-35.3413
4GG60752	60752	284	17.4603	436.5074	305.5552	231.3489	21.5552	-52.6511
4FG68492	68492	249	15.46043	386.5107	270.5575	204.8507	21.5575	-44.1493
4FG69141	69141	238	14.83885	370.9712	259.6798	196.6147	21.67985	-41.3853
4FG6969	6969	294	18.04062	451.0155	315.7108	239.0382	21.71084	-54.9618
4FG68561	68561	271	16.76843	419.2107	293.4475	222.1817	22.44748	-48.8183
4GG70052	70052	285	17.61491	440.3728	308.261	233.3976	23.26098	-51.6024
4FG69123	69123	234	14.75774	368.9434	258.2604	195.54	24.26038	-38.46
4FG68521	68521	275	17.12351	428.0878	299.6614	226.8865	24.66145	-48.1135
4FG6981	6981	299	18.50575	462.6437	323.8506	245.2011	24.85057	-53.7989
4GG70293	70293	256	16.06085	401.5212	281.0648	212.8062	25.06484	-43.1938
4FG69603	69603	290	18.02246	450.5614	315.393	238.7976	25.39301	-51.2024
4FG68582	68582	305	18.91946	472.9864	331.0905	250.6828	26.09051	-54.3172
4GG6061	6061	306	19.04316	476.0791	333.2553	252.3219	27.25535	-53.6781
4GG6053	6053	260	16.44664	411.1659	287.8162	217.9179	27.81616	-42.0821
4FG68683	68683	304	19.00626	475.1566	332.6096	251.833	28.60959	-52.167
4FG6959	6959	235	15.08851	377.2126	264.0488	199.9227	29.04884	-35.0773
4GG60841	60841	113	8.141918	203.5479	142.4836	107.8804	29.48356	-5.11959
4FG68063	68063	316	19.74217	493.5541	345.4879	261.5837	29.4879	-54.4163
4FG58773	58773	284	17.94199	448.5498	313.9849	237.7314	29.98488	-46.2686
4GG70231	70231	245	15.73577	393.3943	275.376	208.499	30.37601	-36.501
4GG7014	7014	270	17.18213	429.5532	300.6873	227.6632	30.68727	-42.3368
4FG6872	6872	241	15.57085	389.2713	272.4899	206.3138	31.48992	-34.6862
4FG6988	6988	244	15.75081	393.7703	275.6392	208.6982	31.63918	-35.3018
4FG6847	6847	268	17.15242	428.8104	300.1673	227.2695	32.16727	-40.7305
4FG6867	6867	253	16.33085	408.2712	285.7899	216.3837	32.78985	-36.6163
4FG69511	69511	254	16.43779	410.9447	287.6613	217.8007	33.66128	-36.1993
4FG69952	69952	251	16.26836	406.7091	284.6964	215.5558	33.69635	-35.4442
4FG68341	68341	131	9.432828	235.8207	165.0745	124.985	34.07449	-6.01503

4FG69513	69513	216	14.32137	358.0341	250.6239	189.7581	34.62389	-26.2419
4GG70073	70073	256	16.6232	415.5799	290.9059	220.2574	34.90594	-35.7426
4GG7141	7141	272	17.54158	438.5395	306.9776	232.4259	34.97764	-39.5741
4GG7023	7023	340	21.45203	536.3007	375.4105	284.2394	35.4105	-55.7606
4FG6995	6995	225	14.90832	372.7081	260.8956	197.5353	35.89564	-27.4647
4GG70203	70203	191	13.02647	325.6617	227.9632	172.6007	36.96316	-18.3993
4FG58541	58541	325	20.71546	517.8866	362.5206	274.4799	37.52064	-50.5201
4FG58982	58982	261	17.07826	426.9565	298.8696	226.287	37.86956	-34.713
4FG69703	69703	310	19.88027	497.0068	347.9048	263.4136	37.90476	-46.5864
4FG68293	68293	296	19.08634	477.1585	334.011	252.894	38.01097	-43.106
4FG69623	69623	304	19.56548	489.1371	342.396	259.2427	38.39598	-44.7573
4FG6971	6971	177	12.32057	308.0143	215.61	163.2476	38.61004	-13.7524
4FG5865	5865	259	17.01593	425.3982	297.7788	225.4611	38.77875	-33.5389
4GG7029	7029	294	19.02012	475.503	332.8521	252.0166	38.85208	-41.9834
4FG68053	68053	302	19.50143	487.5357	341.275	258.3939	39.27502	-43.6061
4GG60711	60711	195	13.43834	335.9586	235.171	178.058	40.17099	-16.942
4GG60632	60632	294	19.09653	477.4133	334.1893	253.029	40.18929	-40.971
4GG60983	60983	252	16.69656	417.414	292.1898	221.2294	40.1898	-30.7706
4GG70141	70141	216	14.67152	366.7879	256.7515	194.3976	40.75154	-21.6024
4FG5887	5887	327	21.02769	525.6922	367.9845	278.6169	40.98454	-48.3831
4FG58431	58431	267	17.60776	440.1939	308.1357	233.3028	41.13575	-33.6972
4GG60723	60723	292	19.04164	476.0411	333.2288	252.3018	41.22876	-39.6982
4GG70143	70143	155	11.24605	281.1512	196.8058	149.0101	41.80582	-5.98988
4FG58652	58652	290	19.00865	475.2161	332.6513	251.8646	42.6513	-38.1354
4FG69323	69323	283	18.62409	465.6022	325.9215	246.7692	42.92155	-36.2308
4FG6966	6966	290	19.02905	475.7264	333.0084	252.135	43.00845	-37.865
4GG71103	71103	165	11.90677	297.6692	208.3685	157.7647	43.36847	-7.2353
4GG6040	6040	348	22.36501	559.1252	391.3877	296.3364	43.38767	-51.6636
4FG69882	69882	229	15.58097	389.5242	272.6669	206.4478	43.66692	-22.5522
4FG6875	6875	249	16.74727	418.6817	293.0772	221.9013	44.07717	-27.0987
4FG69802	69802	187	13.20539	330.1347	231.0943	174.9714	44.09426	-12.0286
4FG6946	6946	284	18.76381	469.0952	328.3666	248.6204	44.36661	-35.3796
4FG69502	69502	249	16.78206	419.5516	293.6861	222.3623	44.68609	-26.6377
4FG68793	68793	239	16.2122	405.305	283.7135	214.8117	44.71352	-24.1883

4FG6923	6923	287	19.00702	475.1754	332.6228	251.843	45.62279	-35.157
4GG71622	71622	266	17.81315	445.3288	311.7301	236.0242	45.73013	-29.9758
4FG69592	69592	301	19.83038	495.7596	347.0317	262.7526	46.0317	-38.2474
4GG7030	7030	191	13.63384	340.8461	238.5922	180.6484	47.59224	-10.3516
4FG69401	69401	228	15.77077	394.2694	275.9886	208.9628	47.98856	-19.0372
4FG68783	68783	276	18.55367	463.8418	324.6893	245.8362	48.68927	-30.1638
4FG58843	58843	294	19.58316	489.5789	342.7053	259.4768	48.70525	-34.5232
4FG68623	68623	280	18.79482	469.8705	328.9093	249.0314	48.90934	-30.9686
4FG6877	6877	213	14.9803	374.5074	262.1552	198.4889	49.1552	-14.5111
4FG68343	68343	202	14.38381	359.5953	251.7167	190.5855	49.71673	-11.4145
4FG58732	58732	227	15.84446	396.1115	277.278	209.9391	50.27802	-17.0609
4FG68473	68473	238	16.49737	412.4342	288.704	218.5902	50.70397	-19.4098
4FG6819	6819	178	13.08178	327.0445	228.9311	173.3336	50.93113	-4.66643
4FG6844	6844	315	20.91177	522.7943	365.956	277.081	50.95599	-37.919
4GG60423	60423	255	17.5129	437.8226	306.4758	232.046	51.47581	-22.954
4GG71643	71643	207	14.77352	369.3379	258.5366	195.7491	51.53655	-11.2509
4FG58573	58573	268	18.28556	457.139	319.9973	242.2837	51.99728	-25.7163
4FG79062	79062	343	22.60549	565.1373	395.5961	299.5228	52.59612	-43.4772
4FG79392	79392	328	21.75316	543.8289	380.6802	288.2293	52.68022	-39.7707
4FG68471	68471	222	15.69609	392.4023	274.6816	207.9732	52.68163	-14.0268
4FG68482	68482	219	15.54051	388.5128	271.959	205.9118	52.95896	-13.0882
4FG68672	68672	275	18.74808	468.7019	328.0913	248.412	53.09132	-26.588
4FG69761	69761	115	9.613726	240.3432	168.2402	127.3819	53.24021	12.38187
4FG69011	69011	253	17.52314	438.0784	306.6549	232.1816	53.65489	-20.8184
4FG69881	69881	230	16.21701	405.4252	283.7976	214.8753	53.79762	-15.1247
4FG69591	69591	311	20.84602	521.1504	364.8053	276.2097	53.80531	-34.7903
4FG69562	69562	300	20.24727	506.1818	354.3273	268.2764	54.32729	-31.7236
4FG68472	68472	247	17.23747	430.9367	301.6557	228.3964	54.65568	-18.6036
4GG6085	6085	170	12.83939	320.9848	224.6894	170.122	54.68939	0.121968
4FG58783	58783	274	18.79521	469.8801	328.9161	249.0365	54.9161	-24.9635
4FG6887	6887	315	21.14507	528.6268	370.0387	280.1722	55.03873	-34.8278
4FG68382	68382	244	17.1618	429.0451	300.3315	227.3939	56.33154	-16.6061
4FG58852	58852	169	12.87776	321.9439	225.3607	170.6303	56.36074	1.630272
4FG69372	69372	168	12.83104	320.7759	224.5431	170.0112	56.54312	2.011222

4FG69112	69112	323	21.6991	542.4775	379.7343	287.5131	56.73427	-35.4869
4GG7019	7019	197	14.51988	362.997	254.0979	192.3884	57.0979	-4.61159
4FG69363	69363	272	18.83745	470.9363	329.6554	249.5962	57.65542	-22.4038
4GG60741	60741	201	14.82467	370.6168	259.4318	196.4269	58.43179	-4.57307
4GG70191	70191	262	18.31498	457.8745	320.5121	242.6735	58.51214	-19.3265
4FG69632	69632	287	19.74564	493.641	345.5487	261.6297	58.54872	-25.3703
4FG6989	6989	322	21.79693	544.9232	381.4462	288.8093	59.44623	-33.1907
4FG69243	69243	221	16.03681	400.9203	280.6442	212.4877	59.64418	-8.51227
4FG69432	69432	234	16.79256	419.8139	293.8697	222.5014	59.86973	-11.4986
4FG5843	5843	217	15.85004	396.251	277.3757	210.013	60.37567	-6.98699
4FG58882	58882	145	11.75405	293.8512	205.6958	155.7411	60.69585	10.74114
4FG69851	69851	216	15.82077	395.5192	276.8634	209.6252	60.86343	-6.37483
4FG68051	68051	270	18.95688	473.9221	331.7455	251.1787	61.74548	-18.8213
4FG68383	68383	222	16.235	405.875	284.1125	215.1137	62.1125	-6.88625
4FG68522	68522	222	16.28915	407.2287	285.0601	215.8312	63.06006	-6.16881
4FG68542	68542	258	18.37692	459.4231	321.5961	243.4942	63.59614	-14.5058
4GG6063	6063	334	22.72305	568.0763	397.6534	301.0805	63.65343	-32.9195
4FG69701	69701	266	18.84971	471.2428	329.87	249.7587	63.86996	-16.2413
4FG6853	6853	194	14.75487	368.8718	258.2103	195.5021	64.21026	1.502051
4FG7928	7928	225	16.53989	413.4972	289.448	219.1535	64.44803	-5.84649
4FG69542	69542	285	19.97887	499.4717	349.6302	264.72	64.6302	-20.28
4FG58862	58862	259	18.50124	462.5309	323.7716	245.1414	64.77162	-13.8586
4FG68421	68421	300	20.89575	522.3937	365.6756	276.8687	65.67561	-23.1313
4FG5888	5888	231	16.96748	424.187	296.9309	224.8191	65.93091	-6.18088
4FG68282	68282	261	18.72707	468.1769	327.7238	248.1337	66.7238	-12.8663
4GG6075	6075	248	17.98469	449.6173	314.7321	238.2972	66.73214	-9.70281
4FG68541	68541	231	17.02984	425.7461	298.0223	225.6454	67.02225	-5.35458
4FG68443	68443	260	18.75167	468.7918	328.1543	248.4597	68.15426	-11.5403
4FG69453	69453	317	22.0252	550.6299	385.441	291.8339	68.44096	-25.1661
4FG6937	6937	159	13.06454	326.6135	228.6294	173.1051	69.62942	14.10513
4FG68182	68182	211	16.06275	401.5686	281.098	212.8314	70.09804	1.831375
4FG68772	68772	246	18.1348	453.3699	317.359	240.2861	71.35896	-5.71393
4FG6843	6843	260	18.93717	473.4293	331.4005	250.9175	71.40051	-9.08247
4GG71633	71633	254	18.63389	465.8474	326.0931	246.8991	72.09315	-7.1009

4GG6051	6051	179	14.36739	359.1848	251.4293	190.3679	72.42933	11.36792
4GG7004	7004	301	21.36542	534.1354	373.8948	283.0918	72.89477	-17.9082
4FG68731	68731	232	17.42876	435.7189	305.0032	230.931	73.00322	-1.06899
4FG68771	68771	259	18.99663	474.9157	332.441	251.7053	73.44098	-7.29469
4FG69801	69801	295	21.08142	527.0355	368.9249	279.3288	73.92488	-15.6712
4FG68881	68881	181	14.59027	364.7568	255.3297	193.3211	74.32973	12.32108
4GG60612	60612	318	22.44692	561.173	392.8211	297.4217	74.82112	-20.5783
4GG60873	60873	207	16.10556	402.6391	281.8474	213.3987	74.84736	6.398715
4FG68652	68652	234	17.65798	441.4494	309.0146	233.9682	75.01458	-0.03182
4FG7939	7939	307	21.91554	547.8884	383.5219	290.3808	76.52188	-16.6192
4FG79173	79173	220	16.95926	423.9815	296.787	224.7102	76.78704	4.710191
4GG6073	6073	142	12.54412	313.6029	219.5221	166.2096	77.52206	24.20956
4GG6086	6086	327	23.14323	578.5809	405.0066	306.6479	78.00661	-20.3521
4GG71403	71403	234	17.8499	446.2475	312.3732	236.5112	78.37323	2.511157
4FG69883	69883	146	12.86863	321.7159	225.2011	170.5094	79.2011	24.5094
4GG7017	7017	258	19.43215	485.8038	340.0626	257.476	82.06265	-0.52399
4FG68753	68753	238	18.29342	457.3355	320.1349	242.3878	82.13488	4.387839
4FG68532	68532	152	13.40115	335.0288	234.5202	177.5653	82.52016	25.56526
4FG69831	69831	229	17.81604	445.401	311.7807	236.0625	82.78067	7.062505
4GG70133	70133	139	12.71079	317.7698	222.4388	168.418	83.43883	29.41797
4FG68751	68751	238	18.37676	459.419	321.5933	243.4921	83.59331	5.49208
4FG79063	79063	314	22.75701	568.9253	398.2477	301.5304	84.24773	-12.4696
4GG71221	71221	256	19.44983	486.2457	340.372	257.7102	84.37201	1.710233
4FG79292	79292	178	15.0252	375.6299	262.9409	199.0839	84.94095	21.08386
4FG68481	68481	283	21.049	526.2249	368.3574	278.8992	85.35742	-4.10081
4FG58641	58641	316	22.94235	573.5587	401.4911	303.9861	85.49107	-12.0139
4FG69973	69973	208	16.81672	420.418	294.2926	222.8216	86.29262	14.82155
4GG60513	60513	211	17.00002	425.0004	297.5003	225.2502	86.50028	14.25021
4FG69523	69523	237	18.55739	463.9347	324.7543	245.8854	87.75432	8.885412
4FG68523	68523	240	18.73762	468.4404	327.9083	248.2734	87.90829	8.273423
4FG69462	69462	277	20.85343	521.3359	364.9351	276.308	87.93511	-0.69199
4GG6097	6097	300	22.17597	554.3993	388.0795	293.8316	88.07954	-6.16835
4FG58653	58653	265	20.18476	504.619	353.2333	267.4481	88.23329	2.448065
4FG69211	69211	328	23.7936	594.8399	416.3879	315.2651	88.38792	-12.7349

4FG69941	69941	231	18.26226	456.5564	319.5895	241.9749	88.58947	10.97489
4FG6884	6884	234	18.44288	461.0719	322.7504	244.3681	88.75036	10.36813
4GG60631	60631	243	18.95735	473.9338	331.7537	251.1849	88.75367	8.18492
4GG71631	71631	224	17.87457	446.8642	312.805	236.838	88.80495	12.83804
4GG60972	60972	236	18.61839	465.4598	325.8219	246.6937	89.82189	10.69372
4FG58953	58953	276	20.91018	522.7545	365.9282	277.0599	89.92817	1.059901
4GG70492	70492	224	17.94588	448.647	314.0529	237.7829	90.05291	13.78292
4FG68741	68741	207	16.97884	424.4709	297.1296	224.9696	90.12964	17.96958
4GG7140	7140	310	22.87065	571.7662	400.2364	303.0361	90.23635	-6.9639
4FG58832	58832	224	18.00047	450.0117	315.0082	238.5062	91.0082	14.50621
4FG69043	69043	248	19.43577	485.8942	340.126	257.5239	92.12597	9.52395
4FG58633	58633	322	23.68523	592.1308	414.4916	313.8293	92.49157	-8.17067
4FG5885	5885	245	19.29656	482.4139	337.6897	255.6794	92.68974	10.67938
4FG69593	69593	219	17.83014	445.7535	312.0274	236.2493	93.02744	17.24935
4FG58343	58343	291	21.95763	548.9407	384.2585	290.9385	93.25846	-0.06145
4FG68891	68891	226	18.33555	458.3887	320.8721	242.946	94.87211	16.94603
4GG71412	71412	161	14.63722	365.9304	256.1513	193.9431	95.15129	32.94312
4GG70121	70121	342	25.01334	625.3335	437.7334	331.4267	95.73342	-10.5733
4FG68352	68352	190	16.33005	408.2512	285.7759	216.3732	95.77587	26.37316
4FG58782	58782	260	20.34693	508.6732	356.0713	269.5968	96.07125	9.596804
4FG69203	69203	121	12.44998	311.2495	217.8746	164.9622	96.87462	43.96222
4GG7172	7172	285	21.82912	545.7281	382.0096	289.2359	97.00964	4.235872
4FG6865	6865	198	16.89632	422.4081	295.6857	223.8763	97.68566	25.87629
4FG6805	6805	289	22.10357	552.5893	386.8125	292.8723	97.8125	3.87232
4FG58891	58891	291	22.23626	555.9065	389.1345	294.6304	98.13454	3.630437
4FG68453	68453	209	17.55665	438.9162	307.2413	232.6256	98.24135	23.62559
4FG69322	69322	218	18.08583	452.1456	316.5019	239.6372	98.50194	21.63718
4FG5874	5874	224	18.45094	461.2735	322.8915	244.475	98.89146	20.47496
4GG60912	60912	320	23.9803	599.5074	419.6552	317.7389	99.6552	-2.26106
4FG58961	58961	211	17.76954	444.2384	310.9669	235.4464	99.96688	24.44635
4FG69581	69581	243	19.63304	490.8261	343.5783	260.1378	100.5783	17.13782
4FG6973	6973	271	21.30633	532.6581	372.8607	282.3088	101.8607	11.30882
4FG6922	6922	354	26.17224	654.3061	458.0142	346.7822	104.0142	-7.21779
4FG58452	58452	322	24.34859	608.7148	426.1003	322.6188	104.1003	0.61883

4FG58441	58441	277	21.79122	544.7804	381.3463	288.7336	104.3463	11.73362
4GG70081	70081	240	19.77238	494.3095	346.0166	261.984	106.0166	21.98403
4GG70062	70062	232	19.36234	484.0585	338.8409	256.551	106.8409	24.55099
4FG6935	6935	214	18.36649	459.1624	321.4137	243.3561	107.4137	29.35605
4FG68531	68531	158	15.17475	379.3688	265.5581	201.0655	107.5581	43.06545
4GG60603	60603	276	21.96006	549.0014	384.301	290.9708	108.301	14.97075
4FG68871	68871	249	20.45257	511.3144	357.9201	270.9966	108.9201	21.99661
4FG6984	6984	255	20.80142	520.0355	364.0248	275.6188	109.0248	20.61881
4GG70391	70391	138	14.18257	354.5642	248.1949	187.919	110.1949	49.91902
4GG60861	60861	120	13.22646	330.6615	231.4631	175.2506	111.4631	55.25062
4GG71123	71123	278	22.27312	556.8281	389.7797	295.1189	111.7797	17.11888
4GG70281	70281	304	23.85548	596.387	417.4709	316.0851	113.4709	12.08511
4GG60971	60971	155	15.34945	383.7363	268.6154	203.3803	113.6154	48.38026
4GG60403	60403	243	20.40574	510.1434	357.1004	270.376	114.1004	27.37599
4GG71401	71401	110	12.84862	321.2155	224.8509	170.2442	114.8509	60.24422
4GG71002	71002	252	20.97413	524.3532	367.0472	277.9072	115.0472	25.90719
4FG69721	69721	187	17.26282	431.5705	302.0993	228.7323	115.0993	41.73234
4FG5873	5873	136	14.37122	359.2804	251.4963	190.4186	115.4963	54.41861
4FG69733	69733	290	23.19146	579.7866	405.8506	307.2869	115.8506	17.2869
4FG69232	69232	51	9.545119	238.628	167.0396	126.4728	116.0396	75.47282
4GG7039	7039	210	18.63755	465.9387	326.1571	246.9475	116.1571	36.94753
4FG6913	6913	292	23.34791	583.6978	408.5884	309.3598	116.5884	17.35982
4FG68773	68773	246	20.77846	519.4615	363.623	275.3146	117.623	29.31457
4GG70172	70172	278	22.7138	567.8449	397.4914	300.9578	119.4914	22.95781
4GG71301	71301	269	22.22621	555.6553	388.9587	294.4973	119.9587	25.4973
4FG69731	69731	311	24.63494	615.8735	431.1114	326.4129	120.1114	15.41294
4FG58651	58651	248	21.06325	526.5812	368.6068	279.088	120.6068	31.08802
4FG68052	68052	191	17.80781	445.1952	311.6367	235.9535	120.6367	44.95347
4FG68583	68583	306	24.41229	610.3073	427.2151	323.4629	121.2151	17.46288
4FG69702	69702	311	24.73781	618.4451	432.9116	327.7759	121.9116	16.77592
4FG6960	6960	202	18.53074	463.2685	324.2879	245.5323	122.2879	43.53229
4FG6864	6864	236	20.51394	512.8485	358.994	271.8097	122.994	35.80971
4GG7173	7173	241	20.81926	520.4814	364.337	275.8551	123.337	34.85513
4FG58983	58983	195	18.20274	455.0684	318.5479	241.1862	123.5479	46.18624

4FG5876	5876	326	25.79261	644.8153	451.3707	341.7521	125.3707	15.75209
4FG69493	69493	217	19.56518	489.1295	342.3906	259.2386	125.3906	42.23863
4FG68372	68372	106	13.2282	330.705	231.4935	175.2737	125.4935	69.27367
4GG71212	71212	294	23.97317	599.3293	419.5305	317.6445	125.5305	23.64452
4FG69642	69642	215	19.4875	487.1874	341.0312	258.2093	126.0312	43.20932
4GG70032	70032	267	22.5113	562.7826	393.9478	298.2748	126.9478	31.27479
4FG69471	69471	177	17.3707	434.2675	303.9872	230.1617	126.9872	53.16175
4FG68752	68752	201	18.83117	470.7793	329.5455	249.513	128.5455	48.51301
4GG70071	70071	288	23.83026	595.7564	417.0295	315.7509	129.0295	27.75089
4FG6958	6958	294	24.2302	605.755	424.0285	321.0502	130.0285	27.05017
4FG58722	58722	227	20.41388	510.347	357.2429	270.4839	130.2429	43.48392
4FG5866	5866	306	24.95555	623.8888	436.7222	330.6611	130.7222	24.66106
4FG6873	6873	235	20.93051	523.2627	366.2839	277.3292	131.2839	42.32922
4FG58793	58793	294	24.33733	608.4332	425.9033	322.4696	131.9033	28.46961
4FG69303	69303	194	18.65697	466.4242	326.4969	247.2048	132.4969	53.2048
4FG58243	58243	276	23.36956	584.239	408.9673	309.6467	132.9673	33.6467
4FG6874	6874	216	19.96475	499.1188	349.3832	264.533	133.3832	48.53298
4FG68171	68171	282	23.80472	595.1181	416.5826	315.4126	134.5826	33.41258
4FG68362	68362	206	19.46963	486.7407	340.7185	257.9726	134.7185	51.97256
4FG69582	69582	254	22.21796	555.4491	388.8144	294.388	134.8144	40.38802
4GG60701	60701	229	20.79683	519.9206	363.9444	275.5579	134.9444	46.55793
4FG6980	6980	236	21.24223	531.0558	371.739	281.4595	135.739	45.45955
4FG6976	6976	190	18.61399	465.3499	325.7449	246.6354	135.7449	56.63543
4FG58942	58942	227	20.74229	518.5572	362.99	274.8353	135.99	47.83529
4GG71313	71313	178	17.98621	449.6552	314.7586	238.3172	136.7586	60.31724
4FG69641	69641	167	17.36884	434.2209	303.9546	230.1371	136.9546	63.13707
4GG70031	70031	274	23.48666	587.1665	411.0165	311.1982	137.0165	37.19824
4GG71411	71411	196	19.04825	476.2063	333.3444	252.3894	137.3444	56.38936
4FG6999	6999	261	22.83277	570.8192	399.5734	302.5342	138.5734	41.53416
4GG7131	7131	220	20.49524	512.381	358.6667	271.5619	138.6667	51.56192
4FG58673	58673	146	16.29239	407.3098	285.1169	215.8742	139.1169	69.87419
4FG69723	69723	153	16.7084	417.7101	292.397	221.3863	139.397	68.38633
4GG7120	7120	199	19.3613	484.0326	338.8228	256.5373	139.8228	57.53726
4GG7142	7142	175	18.00343	450.0859	315.0601	238.5455	140.0601	63.54551

4FG6809	6809	176	18.09969	452.4922	316.7445	239.8209	140.7445	63.82087
4FG6977	6977	191	18.96009	474.0023	331.8016	251.2212	140.8016	60.22123
4FG69013	69013	230	21.25294	531.3236	371.9265	281.6015	141.9265	51.60149
4FG58781	58781	270	23.62545	590.6362	413.4453	313.0372	143.4453	43.03717
4FG5980	5980	292	24.94687	623.6718	436.5702	330.546	144.5702	38.54604
4FG69631	69631	160	17.42032	435.5081	304.8556	230.8193	144.8556	70.81928
4GG60703	60703	127	15.54058	388.5145	271.9601	205.9127	144.9601	78.91268
4FG6868	6868	298	25.36246	634.0616	443.8431	336.0526	145.8431	38.05263
4GG60422	60422	193	19.39813	484.9532	339.4673	257.0252	146.4673	64.02521
4FG6806	6806	240	22.09331	552.3328	386.633	292.7364	146.633	52.73639
4FG58623	58623	297	25.36952	634.2381	443.9667	336.1462	146.9667	39.1462
4GG60501	60501	318	26.57858	664.4645	465.1251	352.1662	147.1251	34.16618
4GG70221	70221	169	18.07762	451.9406	316.3584	239.5285	147.3584	70.52849
4FG6857	6857	262	23.40448	585.112	409.5784	310.1093	147.5784	48.10934
4GG70022	70022	153	17.19182	429.7956	300.8569	227.7917	147.8569	74.79168
4FG6859	6859	287	24.85817	621.4542	435.018	329.3707	148.018	42.37074
4FG69402	69402	237	22.00325	550.0811	385.0568	291.543	148.0568	54.54301
4GG60413	60413	230	21.60674	540.1684	378.1179	286.2893	148.1179	56.28927
4FG58232	58232	297	25.47429	636.8573	445.8001	337.5344	148.8001	40.53439
4FG69551	69551	316	26.56611	664.1527	464.9069	352.0009	148.9069	36.00092
4GG70011	70011	337	27.77727	694.4318	486.1022	368.0488	149.1022	31.04884
4FG69842	69842	251	22.93225	573.3063	401.3144	303.8523	150.3144	52.85233
4FG68441	68441	186	19.2216	480.5399	336.3779	254.6862	150.3779	68.68616
4FG68721	68721	170	18.31466	457.8664	320.5065	242.6692	150.5065	72.66922
4FG69611	69611	190	19.47092	486.773	340.7411	257.9897	150.7411	67.98971
4FG6829	6829	276	24.39218	609.8046	426.8632	323.1964	150.8632	47.19642
4GG60702	60702	181	19.0234	475.5849	332.9094	252.06	151.9094	71.05999
4FG68762	68762	220	21.25891	531.4727	372.0309	281.6805	152.0309	61.68054
4GG6098	6098	250	22.99532	574.8831	402.4181	304.688	152.4181	54.68802
4GG70282	70282	247	22.8346	570.865	399.6055	302.5585	152.6055	55.55847
4GG6050	6050	250	23.07318	576.8295	403.7806	305.7196	153.7806	55.71962
4GG7003	7003	310	26.58814	664.7035	465.2925	352.2929	155.2925	42.29287
4GG60602	60602	198	20.22604	505.6509	353.9556	267.995	155.9556	69.99499
4FG69262	69262	145	17.28769	432.1922	302.5346	229.0619	157.5346	84.06188

4GG70253	70253	175	19.01789	475.4472	332.813	251.987	157.813	76.987
4GG6070	6070	170	18.78699	469.6746	328.7722	248.9276	158.7722	78.92755
4GG70083	70083	246	23.13308	578.327	404.8289	306.5133	158.8289	60.51332
4GG7130	7130	117	15.80386	395.0964	276.5675	209.4011	159.5675	92.4011
4FG6926	6926	228	22.15261	553.8151	387.6706	293.522	159.6706	65.52202
4FG69532	69532	179	19.38449	484.6122	339.2286	256.8445	160.2286	77.84449
4GG70272	70272	103	15.05453	376.3633	263.4543	199.4726	160.4543	96.47257
4FG59802	59802	273	24.76893	619.2233	433.4563	328.1884	160.4563	55.18837
4FG68732	68732	117	15.87032	396.758	277.7306	210.2817	160.7306	93.28173
4GG60611	60611	146	17.6089	440.2226	308.1558	233.318	162.1558	87.31798
4FG6951	6951	250	23.57363	589.3407	412.5385	312.3506	162.5385	62.35058
4GG70072	70072	206	21.07934	526.9834	368.8884	279.3012	162.8884	73.30122
4GG71623	71623	222	22.03526	550.8814	385.617	291.9671	163.617	69.96715
4FG58872	58872	330	28.21161	705.2902	493.7032	373.8038	163.7032	43.80381
4GG7100	7100	52	12.35721	308.9303	216.2512	163.733	164.2512	111.733
4FG69561	69561	202	20.93883	523.4707	366.4295	277.4395	164.4295	75.43946
4FG68763	68763	160	18.5818	464.5451	325.1815	246.2089	165.1815	86.20888
4GG7027	7027	89	14.66699	366.6746	256.6722	194.3376	167.6722	105.3376
4FG69643	69643	181	19.93887	498.4719	348.9303	264.1901	167.9303	83.19009
4FG5864	5864	248	23.76797	594.1993	415.9395	314.9256	167.9395	66.92562
4FG69803	69803	159	18.69364	467.3411	327.1388	247.6908	168.1388	88.69077
4FG69461	69461	175	19.66378	491.5946	344.1162	260.5451	169.1162	85.54515
4FG5895	5895	286	26.02813	650.7032	455.4922	344.8727	169.4922	58.87267
4FG6936	6936	264	24.7941	619.8526	433.8968	328.5219	169.8968	64.52186
4FG69472	69472	229	22.80752	570.188	399.1316	302.1997	170.1316	73.19966
4FG6816	6816	274	25.39053	634.7633	444.3343	336.4245	170.3343	62.42452
4FG68493	68493	154	18.5527	463.8176	324.6723	245.8233	170.6723	91.82332
4FG68593	68593	214	22.02533	550.6333	385.4433	291.8356	171.4433	77.83564
4FG6947	6947	115	16.38531	409.6328	286.7429	217.1054	171.7429	102.1054
4FG5844	5844	205	21.5821	539.5525	377.6868	285.9628	172.6868	80.96284
4GG7005	7005	217	22.3355	558.3875	390.8713	295.9454	173.8713	78.9454
4FG69872	69872	62	13.4821	337.0524	235.9367	178.6378	173.9367	116.6378
4FG68631	68631	212	22.07972	551.993	386.3951	292.5563	174.3951	80.55628
4FG69741	69741	136	17.74021	443.5053	310.4537	235.0578	174.4537	99.05783

4GG7121	7121	285	26.289	657.2251	460.0576	348.3293	175.0576	63.32931
4FG68351	68351	186	20.65052	516.263	361.3841	273.6194	175.3841	87.61937
4GG70271	70271	123	17.05314	426.3284	298.4299	225.9541	175.4299	102.9541
4FG69332	69332	90	15.28734	382.1835	267.5285	202.5573	177.5285	112.5573
4FG69381	69381	241	23.93336	598.334	418.8338	317.117	177.8338	76.11704
4FG5875	5875	265	25.41089	635.2722	444.6906	336.6943	179.6906	71.69428
4FG58661	58661	300	27.50293	687.5731	481.3012	364.4138	181.3012	64.41376
4FG69682	69682	204	22.03326	550.8315	385.582	291.9407	181.582	87.94067
4FG68332	68332	162	19.63955	490.9889	343.6922	260.2241	181.6922	98.2241
4FG7918	7918	297	27.39311	684.8278	479.3795	362.9587	182.3795	65.95875
4GG71302	71302	305	27.87638	696.9095	487.8367	369.3621	182.8367	64.36206
4FG69362	69362	118	17.20184	430.046	301.0322	227.9244	183.0322	109.9244
4FG68563	68563	188	21.30458	532.6144	372.8301	282.2856	184.8301	94.28564
4FG68461	68461	197	21.87173	546.7932	382.7552	289.8004	185.7552	92.80039
4FG69002	69002	209	22.60517	565.1292	395.5904	299.5185	186.5904	90.51848
4FG68853	68853	193	21.82595	545.6488	381.9542	289.1939	188.9542	96.19388
4GG71621	71621	205	22.6862	567.1551	397.0086	300.5922	192.0086	95.59221
4FG68662	68662	202	22.58631	564.6577	395.2604	299.2686	193.2604	97.26858
4FG68072	68072	262	26.08387	652.0968	456.4677	345.6113	194.4677	83.61129
4FG58543	58543	251	25.79052	644.7629	451.3341	341.7244	200.3341	90.72436
4FG68422	68422	268	26.77081	669.2703	468.4892	354.7133	200.4892	86.71326
4FG5834	5834	193	22.61047	565.2618	395.6833	299.5888	202.6833	106.5888
4FG69893	69893	149	20.13186	503.2966	352.3076	266.7472	203.3076	117.7472
4FG58762	58762	258	26.47733	661.9332	463.3532	350.8246	205.3532	92.8246
4FG69681	69681	314	29.77333	744.3332	521.0332	394.4966	207.0332	80.49659
4GG70283	70283	268	27.14748	678.687	475.0809	359.7041	207.0809	91.70412
4FG6839	6839	139	19.83867	495.9667	347.1767	262.8623	208.1767	123.8623
4FG69143	69143	218	24.39038	609.7596	426.8317	323.1726	208.8317	105.1726
4GG60502	60502	136	19.71701	492.9252	345.0476	261.2503	209.0476	125.2503
4FG69991	69991	122	19.08002	477.0006	333.9004	252.8103	211.9004	130.8103
4FG68491	68491	157	21.13519	528.3797	369.8658	280.0413	212.8658	123.0413
4FG6912	6912	317	30.29425	757.3563	530.1494	401.3988	213.1494	84.39882
4FG58831	58831	77	16.68904	417.2259	292.0582	221.1297	215.0582	144.1297
4FG69962	69962	285	28.59894	714.9735	500.4814	378.9359	215.4814	93.93594

4FG58552	58552	258	27.25429	681.3573	476.9501	361.1194	218.9501	103.1194
4FG79272	79272	203	24.17779	604.4449	423.1114	320.3558	220.1114	117.3558
4FG69102	69102	94	17.96882	449.2205	314.4544	238.0869	220.4544	144.0869
4FG58562	58562	207	24.44902	611.2255	427.8578	323.9495	220.8578	116.9495
4FG58883	58883	316	30.79956	769.9889	538.9922	408.0941	222.9922	92.09412
4FG58792	58792	231	25.98764	649.691	454.7837	344.3362	223.7837	113.3362
4FG69621	69621	237	26.37702	659.4254	461.5978	349.4955	224.5978	112.4955
4GG60402	60402	299	30.00129	750.0323	525.0226	397.5171	226.0226	98.51711
4FG69233	69233	37	15.05244	376.311	263.4177	199.4448	226.4177	162.4448
4GG71213	71213	272	28.48144	712.0361	498.4253	377.3791	226.4253	105.3791
4FG58721	58721	169	22.71356	567.8389	397.4872	300.9546	228.4872	131.9546
4FG68632	68632	285	29.3868	734.6699	514.2689	389.3751	229.2689	104.3751
4FG68092	68092	51	16.01675	400.4188	280.2931	212.222	229.2931	161.222
4GG71721	71721	101	19.05682	476.4206	333.4944	252.5029	232.4944	151.5029
4FG69563	69563	241	27.3315	683.2875	478.3013	362.1424	237.3013	121.1424
4FG6804	6804	329	32.37998	809.4995	566.6496	429.0347	237.6496	100.0347
4FG69861	69861	148	22.08338	552.0846	386.4592	292.6048	238.4592	144.6048
4FG5878	5878	259	28.45926	711.4815	498.0371	377.0852	239.0371	118.0852
4GG7007	7007	164	23.19549	579.8873	405.9211	307.3403	241.9211	143.3403
4FG58443	58443	244	27.96971	699.2427	489.4699	370.5986	245.4699	126.5986
4FG5854	5854	278	30.05477	751.3692	525.9584	398.2257	247.9584	120.2257
4FG69692	69692	250	28.73891	718.4728	502.931	380.7906	252.931	130.7906
4FG6968	6968	241	28.50937	712.7344	498.9141	377.7492	257.9141	136.7492
4FG68682	68682	301	31.96827	799.2068	559.4447	423.5796	258.4447	122.5796
4GG70292	70292	158	23.79975	594.9937	416.4956	315.3467	258.4956	157.3467
4GG6094	6094	82	19.49404	487.351	341.1457	258.296	259.1457	176.296
4FG69633	69633	205	26.86073	671.5181	470.0627	355.9046	265.0627	150.9046
4FG58992	58992	273	30.79845	769.9613	538.9729	408.0795	265.9729	135.0795
4GG7038	7038	110	21.49382	537.3456	376.1419	284.7932	266.1419	174.7932
4FG6974	6974	272	30.7576	768.9401	538.258	407.5382	266.258	135.5382
4GG60911	60911	80	19.87708	496.927	347.8489	263.3713	267.8489	183.3713
4FG68073	68073	270	30.75776	768.944	538.2608	407.5403	268.2608	137.5403
4FG58342	58342	252	29.86112	746.5281	522.5696	395.6599	270.5696	143.6599
4GG6072	6072	149	24.17217	604.3043	423.013	320.2813	274.013	171.2813

4FG58332	58332	161	24.89045	622.2612	435.5828	329.7984	274.5828	168.7984
4GG60953	60953	116	22.43697	560.9244	392.6471	297.2899	276.6471	181.2899
4FG79271	79271	202	27.36467	684.1167	478.8817	362.5819	276.8817	160.5819
4GG7012	7012	325	35.15004	878.751	615.1257	465.738	290.1257	140.738
4FG58993	58993	184	27.33799	683.4498	478.4149	362.2284	294.4149	178.2284
4FG69321	69321	211	29.02805	725.7011	507.9908	384.6216	296.9908	173.6216
4FG58551	58551	212	29.10607	727.6518	509.3563	385.6555	297.3563	173.6555
4FG5990	5990	140	25.08824	627.2061	439.0442	332.4192	299.0442	192.4192
4GG7015	7015	268	32.90374	822.5935	575.8155	435.9746	307.8155	167.9746
4FG68081	68081	21	18.93633	473.4083	331.3858	250.9064	310.3858	229.9064
4GG71402	71402	131	25.29219	632.3048	442.6134	335.1215	311.6134	204.1215
4FG69153	69153	267	33.18801	829.7003	580.7902	439.7412	313.7902	172.7412
4FG69373	69373	122	25.11661	627.9152	439.5407	332.7951	317.5407	210.7951
4FG5883	5883	178	28.33148	708.287	495.8009	375.3921	317.8009	197.3921
4FG68691	68691	164	27.97693	699.4233	489.5963	370.6944	325.5963	206.6944
4FG6855	6855	127	25.93845	648.4611	453.9228	343.6844	326.9228	216.6844
4GG60903	60903	317	36.99217	924.8043	647.363	490.1463	330.363	173.1463
4GG70243	70243	175	30.48	762.0001	533.4	403.86	358.4	228.86
4FG69113	69113	305	38.19542	954.8856	668.4199	506.0894	363.4199	201.0894
4FG69152	69152	307	38.42834	960.7084	672.4959	509.1754	365.4959	202.1754
4FG58821	58821	223	34.05023	851.2557	595.879	451.1655	372.879	228.1655
4FG6904	6904	235	35.58965	889.7413	622.8189	471.5629	387.8189	236.5629
4FG7907	7907	274	37.9631	949.0776	664.3543	503.0111	390.3543	229.0111
4GG70042	70042	256	37.69194	942.2986	659.609	499.4183	403.609	243.4183
4GG6080	6080	46	25.74112	643.5281	450.4697	341.0699	404.4697	295.0699
4FG58632	58632	241	37.50421	937.6054	656.3238	496.9308	415.3238	255.9308
4FG69793	69793	121	32.53847	813.4618	569.4232	431.1347	448.4232	310.1347
4GG6087	6087	101	31.43606	785.9015	550.131	416.5278	449.131	315.5278
4FG5889	5889	207	37.63279	940.8197	658.5738	498.6345	451.5738	291.6345
4FG58532	58532	263	41.49554	1037.389	726.172	549.8159	463.172	286.8159
4FG68292	68292	110	34.0646	851.6149	596.1304	451.3559	486.1304	341.3559
4FG68392	68392	187	41.13827	1028.457	719.9198	545.0821	532.9198	358.0821
4FG58662	58662	295	47.74625	1193.656	835.5594	632.6378	540.5594	337.6378
4FG58771	58771	250	50.45463	1261.366	882.956	668.5239	632.956	418.5239

4FG5992	5992	257	53.11724	1327.931	929.5516	703.8034	672.5516	446.8034
4GG70012	70012	254	59.1609	1479.022	1035.316	783.8819	781.3157	529.8819

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